CARPENTRY AND BUILDING

VOL. XXXI.—1909.

NEW YORK:
DAVID WILLIAMS COMPANY,
14-16 PARK PLACE

INDEX.

A

B

N

O

P

T

Carpentry and Building

NEW YORK, JANUARY, 1909.

A Model Village of Workingmen's Homes

AN unusual degree of interest is being manifested at the present time in the design and arrangement of dwelling houses adapted to meet the requirements of wage earners in varying circumstances, and who are naturally desirous of pleasing and attractive home surroundings so that they may enjoy to the fullest extent the comforts compatible with their station in life. This interest has been stimulated in a measure at least by the rapid development of industrial centers and the efforts of large employers of labor to provide comfortable housing accommodations for their men and the families dependent upon them. There has also been much building of this character in the suburban sections of many of the larger cities of the country, all of which has tended to create a demand for plans of houses suitable for the laboring classes and for those in even more comfortable circumstances.

We have in the past given incidental attention to the subject and published now and then plans of low cost houses in direct response to inquiries emanating from many of our readers for designs of this nature. With a view, however, to affording still further suggestions to those who are interested in the arrangement of houses varying from the two-story, four-room dwelling, built in rows or blocks, to the better class of habitation designed for employees receiving a larger income, we take pleasure in laying before our readers the plans of a few of the several types of wage earners' houses located in the industrial village of Roebling, N. J., and which in its way is a model community of working people. The folded half-tone supplemental plate which accompanies this issue carries several views in the village in question indicating in a measure the appearance of some of the various styles of buildings, while on several pages which follow there are floor plans of seven different types of workingmen's homes erected not long since in the place named. We show on this page a row of houses, the first three of which are of what is known as type No. 5, and the next four type No. 9, the floor plans being presented on page 3. The houses were built to provide comfortable accommodations for its workmen and their families at Roebling, N. J., by the John A. Roebling Sons' Company, at which place is located a recent addition to the company's steel plant, the main works being at Trenton.

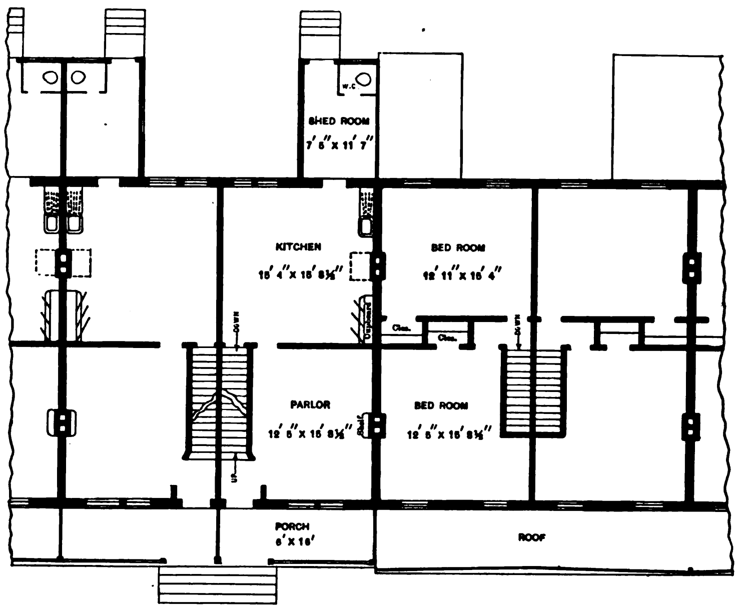
It may not be without interest to state in this connection that the village of Roebling is located 10 miles below the city of Trenton on the south bank of the Delaware River, the site consisting of a tract of 250 acres extending along the river for about 1½ miles and on a bluff 40 ft. above the surface of the water, the face of the bluff being several hundred yards back from the river bank. The village is laid out with broad streets and walks, the wider thoroughfares being planted with maple trees along both sides near the curb line, while the spaces in front of the houses not occupied by the sidewalks have been cultivated in grass plots.

A Row of Detached Houses in the Village of Roebling, N. J.

A Model Village of Workingmen's Homes.

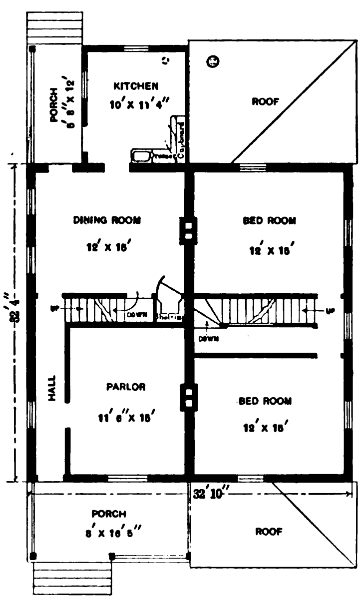
At the present time there are something more than 300 houses in the village, exclusive of three hotels for workingmen and two store buildings, all erected within the last two or three years. There are 10 types of houses, all constructed of brick, with slate roofs, in a most substantial manner and fitted with the modern conveniences. Type No. 1, the first and second floor plans of which are shown herewith, is a two-story four-room and attic dwelling, with a shed extension in the rear containing toilet. This type of house has yellow pine trim, finished natural, and is built in blocks or rows of 10. The house known as Type No. 2, the floor plans of which are also shown herewith, is a semidetached two-story and attic dwelling, or, as some would call it, a "twin" or "double" house, containing seven rooms including a shed kitchen. This house has yellow pine trim finished natural. The next type which we illustrate is No. 4, containing six rooms, with bathroom and a shed extension. It is of the semidetached type and is steam heated.

Coming now to the better class of dwellings, we have Type No. 5, also of the semidetached style and two stories and attic in hight. It has nine rooms, with bath, shed extension, and laundry in the cellar. It is heated by steam, lighted by electricity, and the interior trim is of fourth page we show plans of Type No. 6, which is three stories in hight and contains 10 rooms and bath, thus adapting it to still larger family requirements. Each house of this style is 20 ft. wide, has yellow pine trim, finished natural, laundry in the cellar, is steam heated and lighted by electricity. This type is built eight houses to the street block.

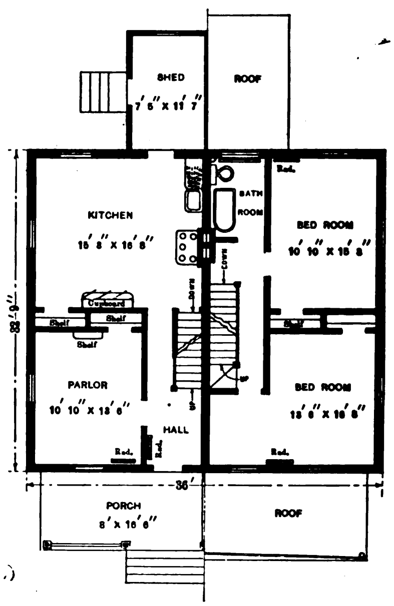


FIRST FLOOR PLAN SECOND FLOOR PLAN

First and Second Floor Plans of House Type No. 1.



Half of First and Second Floor Plans of Type No. 2.



Half of First and Second Floor Plans of Type No. 4.

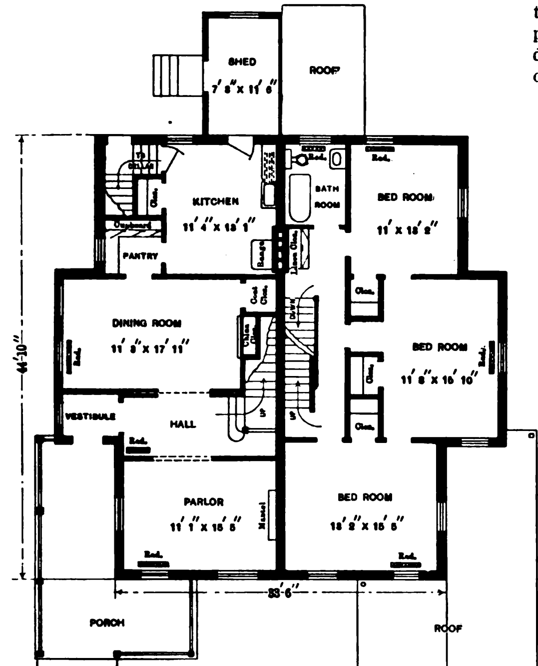
A Model Village of Workingmen's Homes.—Floor Plans of Three Types of Houses—Scale,* 1-16 *In. to the Foot.

cypress, finished natural. In the case of Type No. 7, of which first and second floor plans are given, we have a very attractive "double" or "twin" dwelling of the semidetached style and two stories and attic in hight. There are eight rooms and bath, with butler's pantry, reception hall and vestibule, with laundry in the cellar. This is steam heated, has electric lights and cypress trim. Type No. 9 is two stories and attic in hight, contains eight rooms and bath and the modern conveniences. On the

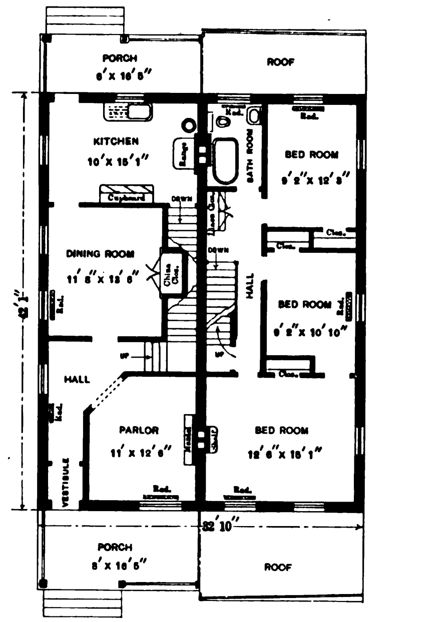
All houses except Types Nos. 1 and 6 are built on lots 30 ft. wide by 100 ft. deep. Those designated as types No. 1 occupy lots 16 ft. wide by 100 ft. deep, and houses of Type No. 6 occupy lots 20 ft. front by 120 ft. deep. All back yards are inclosed on three sides by a substantial fence of wire netting, 4 ft. high, supported by a strong framework. Through the center of all blocks extend 10-ft. alleys for the convenient collection of ashes and garbage and also for the accommodation of delivery

wagons, so that the material enters and goes out by way of the back yards. This tends to keep the streets free from litter and reduced the labor of keeping clean to a minimum.

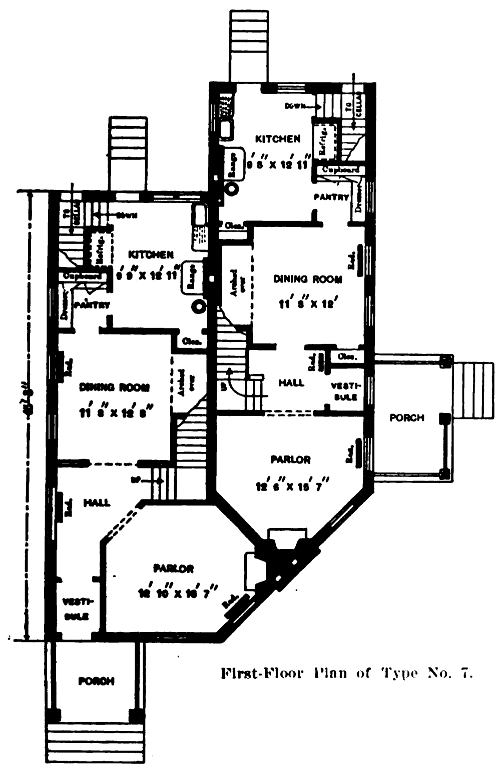
At the immediate left is the "General Store." Referring further to the supplemental plate, the picture shown in the lower left hand corner represents two types of houses, No. 1 being on the left and No. 4 on the right. The picture at the top and center of the plate represents one of the principal cross streets of the village, having a parkway down the center and water stand pipe at the intersection of the main street. The houses in the foreground are of



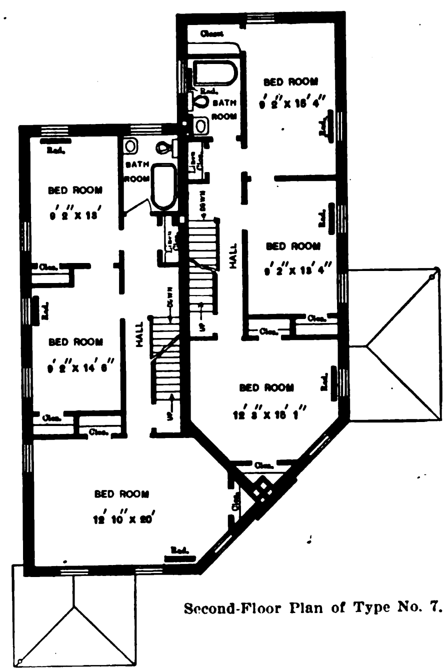
Half of First and Second Floor Plans of Type No. 5.



Half of First and Second Floor Plans of Type No. 9.



First-Floor Plan of Type No. 7.



Second-Floor Plan of Type No. 7.

A Model Village of Workingmen's Homes.—Floor Plans of Three Types of Houses.—Scale, 1-16 In. to the Foot.

Two workingmen's hotels are indicated in the upper right hand picture of the folded supplemental plate, while the model bakery, town hall, fire department and emergency hospital are shown in the center of the plate, the building being located on the corner of intersecting streets.

Type No. 3, of the semidetached order, containing eight rooms and bath. The houses shown on the corners of the streets in the lower right hand picture are of Type No. 8, having eight rooms and bath, with a reception hall and vestibule, and cypress trim, natural finish. There is a

laundry in the cellar, the heating is by steam, and the lighting by electricity.

It may be interesting to state that the streets of the village are lighted by arc lamps, and all public buildings together with the better class of houses are lighted by incandescent lamps, the power being furnished by the company at a very low rate. The electricity for the lights is supplied from the power station of the company's steel works, use being made of a high tension current transformed to low voltage at each building. Illuminating gas is supplied from an outside corporation, but the Roebling Company owns its own street mains and furnishes every house desiring it with gas. The village is also supplied with a system of water works, with fire hydrant on every block, and stand pipe pressure sufficient for fire protection. The water system is extended to every house. A street system of sewers is in operation to which every house is connected, even the cheapest dwellings being provided with kitchen sinks and sanitary toilets.

It may be here stated that the rents of the various types of houses are based on the cost of each, and are so proportioned that the interest on the original investment is but a small amount after deducting the cost of operation. The entire idea is to afford to the employees of the company a maximum of convenience and comfort in the way of living accommodations for the amount of capital invested.

All the engineering work in connection with the project of this model village was done by the regular employees of the John A. Roebling Sons Company, the designing of the buildings and the supervision of their construction being in the hands of Isaac Harby, C. E., ably assisted by C. S. Arms, the resident engineer of the village.

PUBLIC TRADE SCHOOLS IN FITCHBURG, MASS., have been started on a new plan. Through the co-operation of the manufacturers in the city's leading industries pupils in the contemplated four years' course are to be provided with work in various local factories. After the first year of school instruction the student will alternate a week in school and a week in the shop, receiving from the employer the pay of an apprentice. The city during the other weeks gives theoretical instruction as a part of the public school system. This has the double advantage of keeping the student interested in the theoretical part of the work and providing him with some remuneration. To follow out the four years' work as outlined will necessarily make the student more valuable both as a hand and a head worker.

Fire Doors for Mills and Warehouses.

United States Consul Church Howe has forwarded from Manchester to the State Department the following description of an armored door, which is taking the place of the iron door in British factories and warehouses:

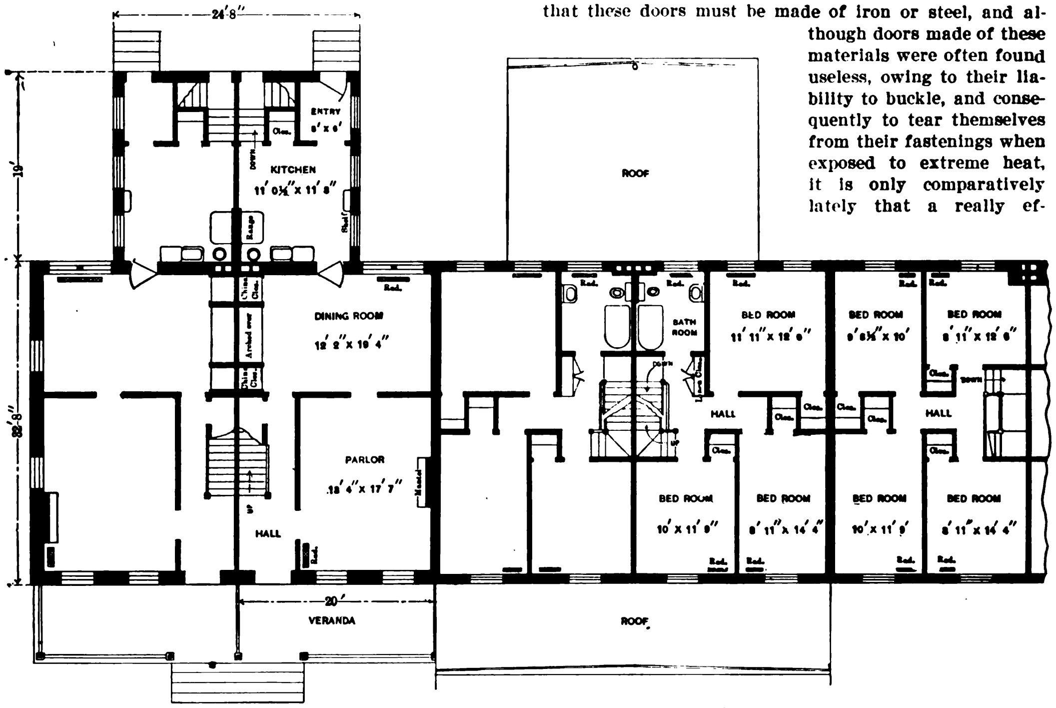
Within the last few years a great change has been taking place in the materials employed for the construction of fire resisting doors. Formerly it was supposed that these doors must be made of iron or steel, and although doors made of these materials were often found useless, owing to their liability to buckle, and consequently to tear themselves from their fastenings when exposed to extreme heat, it is only comparatively lately that a really effective substitute has been discovered. Although the iron door is still made use of occasionally in all classes of buildings, and I understand with comparative frequency in Manchester warehouses, one finds that in buildings designed for manufacturing purposes, and especially in textile factories, the armored door is rapidly taking its place, and giving satisfaction.

The armored type of fire door is constructed of several thicknesses of well seasoned pine boards, planed, tongued and grooved, and nailed together with wrought iron nails driven flush and clinched on the other side.

The wood is then completely covered with tinned steel sheets of not less than No. 26 standard wire gauge, each sheet being of a limited size, lock jointed, and fitting close to the wood, so that while free to expand, they exclude the air and cannot become detached.

By this means combustion is prevented, and it is found that an exposure of several hours to the fiercest heat results only in the surface of the outer boards becoming slightly carbonized to the depth of a fraction of an inch.

The British insurance companies under their tariffs specify that openings to be protected by fire resisting doors must not exceed 9 ft. in hight or 45 superficial feet in area.



Floor Plans of House of Type No. 6.—Scale, 1-16 In. to the Foot.

A Model Village of Workingmen's Homes.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—I.

BY EDWARD H. CRUSSELL.

IN considering the subject indicated by the above title the author has thought it would probably be well to set forth a few words as a sort of preface in order that he might be able to offer the usual apologies and afford some idea of the scope of what is to follow. The jobbing carpenter at the present day is not nearly so much in evidence as was formerly the case, but there is still sufficient of this class of work in the way of alterations and repairs to render it advisable for the young mechanic to possess a working knowledge of it. It is with a view of affording him some suggestions concerning the manner in which work of the character indicated should be done that the following comments are presented:

The author spent a number of years in a shop where little else but jobbing work was done, and his time book kept during a portion of that period shows jobs that are many and varied, ranging all the way from the tearing up of floors in search of dead rats to the making of children's toys. Much of this work could not be classed as carpentry and will not be discussed; a lot more of it was composed of odds and ends which, although sufficiently interesting at the time of execution, have hardly enough of what might be called general interest to make it advisable to describe them at this time. The balance of it was carpentry proper, and consisted of work that might fall to the lot of any carpenter. The methods of doing the latter kind of work will be the humble endeavor of the author to describe. He does not claim that his methods are the only ones, nor even that they are the best, merely that in the absence of anything better they describe some way of doing it, and he hopes to be able to make up for the lack of style and literary merit of the matter by the clearness of his explanations. Recent letters to the Correspondence pages of *Carpentry and Building* have shown that there is a call for information written in the simple language of the workshop, and this will perhaps in a measure explain what to some of the readers may appear a lot of unnecessary information on a series of very simple subjects.

At the commencement of our subject probably it will not be considered out of place to say a few words concerning tools and workshop appliances. Of tools, the jobbing carpenter will need all that his box and inclinations will justify, and as a general thing they should be the best obtainable, for money spent for good tools is money well invested, while money spent for poor ones is money wasted. Good tools may at the present time be obtained at a fair price from almost any reputable firm, the difference in quality between the better class of saws, appliances, etc., being scarcely more than a matter of individual preference. This being so, it is neither possible nor advisable for the writer to say anything here regarding the selection of those tools that are in every day use. There are a few, however, not so well known and yet so serviceable that having once been used they become almost indispensable. It is of these the writer would speak, prefacing his remarks with the statement that apart from their use to him as a workman he has no interest either in the tools mentioned or the manufacturers supplying them.

Foremost among the tools in question may be mentioned the combination square illustrated in Fig. 1 of the engravings. In this tool the workman has a miter and try square which is absolutely accurate, with a blade that may be adjusted to any length from nothing up to 12 in., and which has the advantage over the ordinary squares in that it may be taken apart for placing in the tool chest.

The automatic drill, Fig. 2, is another excellent tool that can be made useful in a number of ways. It is just the thing for putting on door checks, transom fittings, and such like hardware, where the workman must stand on a trestle or stepladder. Being worked with one hand it can be used in places where a brace and bit cannot. It is also useful for boring nail holes in hardwood moldings, especially in moldings that have been saw kerfed. It is to be understood that the writer does not attempt to point out all the possibilities of any of these tools, but is simply bringing to the notice of the workman a few points peculiar to the tools under discussion. Stanley's plow plane is also an excellent tool—one that is almost indispensable to the jobbing carpenter. Its capabilities are so well known that it is unnecessary to enlarge upon them here, and the same may be said of most of the spiral screwdrivers at present on the market. In the matter of screwdrivers, I would saw, pay your money and get good ones—nothing looks so amateurish as work with the screw heads scratched, marked and perhaps broken through the use of poor screwdrivers.

A handy tool is the ratchet screwdriver with three interchangeable blades. Some pieces of hardware take just that number of different sizes of screwdriver to put them on properly and when there is only the one piece to apply, tools of this description are handy as space savers in the carrying box when going out of the shop to do the job.

The folding-handle draw-knife, Fig. 3, tells its own story to any one who has had his fingers cut by the old-fashioned kind by hunting for something else in the tool chest. The folding feature in this instance represents a great deal more than a space saver.

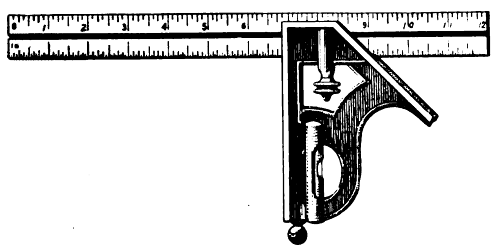


Fig. 1.—Combination Square and Level.

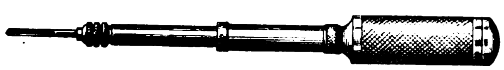


Fig. 2.—Automatic Drill.

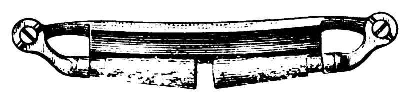


Fig. 3. Folding Draw Knife.

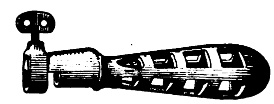


Fig. 4.—File Handle.

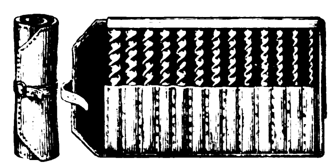


Fig. 5.—Canvas Roll for Keeping Boring Bits.

The Jobbing Carpenter and Some of His Work.—I.

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—EDITOR *Carpentry and Building*.

The file handle, shown in Fig. 4, may be bought for a few cents, and can be used for many other purposes besides holding files. In case of emergency it may be fitted with a nail, and used as a scratch awl or brad awl. Half a dozen brad awls of different sizes may be made for one of these handles out of a piece of steel wire, and they will have an advantage over the brad-awls one may purchase, in that they will not pull out of the handle. Ordinary brace bits may be clamped in the handle and used where a brace and bit are either inconvenient, if not impossible. Small screwdriver blades and pieces of band saw may also be fitted to the handle, but probably enough has already been said regarding this convenient little tool, as the intelligent workman will easily grasp its possibilities.

A reamer and countersink for metal are absolute necessities to the jobbing carpenter who aspires to do really good work, a lot of the present-day hardware not being properly countersunk for screws. A hack saw and the commoner sizes of twist drill bits should also be carried in the outfit, as they are the only tools competent to handle the nails so frequently met with in repair work.

Of all the temper-trying things with which the jobbing carpenter has to contend—and goodness knows there are enough of them—old nails take a foremost place, and this brings me to where I am constrained to remark that although as a general thing his tools should be of the best obtainable it will yet pay the mechanic to have a few duplicates of a cheaper brand—tools that he will not be afraid to subject to rough usage. A set of cheap pieces for use in doubtful situations will prolong the life of his good set, and a cheap hand saw with rather coarse teeth and with a soft temper will enable him to keep his good saws in better trim. The reason for a saw of soft temper will be obvious when the mechanic stops to think that in some cases he may have to file it three or four times in one day. To the younger members of the craft who are at present beginners in the art of saw filing, this same soft saw, with the coarse teeth, affords the very best of practice concerning which the writer may have something to say later, if there is a call for it.

A canvas roll, such as is indicated in Fig. 5 is the handiest and neatest thing in which to keep boring bits; much better than either throwing them loose in the till of the tool chest or leaving them in the box in which they come from the makers. These boxes, although things of beauty are seldom joys forever, and take up altogether too much room in the modern tool chest. The jobbing carpenter moves his tools around a good deal, and any of them that he can fix up in one of these rolls, such as the smaller sizes of chisels or the cutters for his plow plane, will be all the better for it.

Among the first things that a carpenter requires in commencing work are a pair of trestles or saw horses and a work bench, and right here would seem to be a good place to introduce them to the attention of the reader. The only excuse offered for presenting so simple a matter as the construction of a saw horse is the multitude of weird looking contraptions of all shapes, hights and sizes that I have at different times noticed doing duty for this useful article. The average mechanic gets a different size and shape of saw horse every time he makes one, generally arriving at the proper length for the legs by making them much too long in the first place and cutting them down afterward to suit his requirements. Right here allow me to say that there is no need for all this "cutting and trying," and in the absence of any specific standard it is well for the workman to form one of his own, and adhere to it. In Fig. 6 is shown side and end views of a saw horse, the sizes marked on it being those that have been used by the writer for a number of years, and given entire satisfaction. The length of the top may be varied to suit special conditions, but the hight and spread of the legs should remain the same. The size of material shown in this instance is 2 x 4, although of course the workman will generally use the material provided him for the purpose, which may be any old size at all; 2 x 4, however, makes a good solid construction, and although a trifle heavy for some classes of work it is generally the kind of lumber most available.

In Fig. 7 is clearly shown the manner of marking out the leg by means of the steel square. Place the square on the edge of the material with the 20 in. mark of the blade against one corner, and the 7 in. mark of the tongue against the other; mark along the tongue and around the end of the blade. Fig. 8 shows the material as it will now appear. Turn it on its side, and place the square on it, with the 4 in. mark of the tongue against one of the marks already made, and the extreme end of the blade against the same corner of the material, all as clearly indicated in Fig. 9. This marks the leg for the necessary batter endwise. Reverse the square and mark the other end of the leg with the same bevel; cut out this leg, and use it as a pattern by which to mark the others, taking care to cut them in pairs. After cutting a sufficient number of legs cut the tops and nail the legs firmly to them at a distance of 4 in. from the ends. This brings the bottom of the legs in a plumb line with the end of the top of the sawhorse. After the legs are on, take a scrap of 1 x 8 and nail across each pair, close under the top, as shown in the sketches. Cut them off close to the legs, and the saw horse is finished.

A very handy appliance for the jobbing carpenter is a small trestle about the same hight and length as this saw horse, but with a wider top, say, about 9 in., and with a tray fitted in between the legs about 8 in. up from the floor. The whole thing should be made as light as possible consistent with strength, it forming a combined saw horse, trestle and carrying box. It will be found a very handy article for use on small jobs.

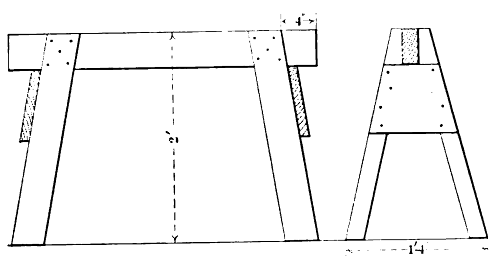


Fig. 6.—Side and End Views of Sawhorse.

Fig. 9.—Cutting Out Leg for Use as a Pattern.

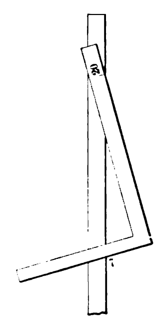


Fig. 7.—Marking Out Leg with Steel Square.

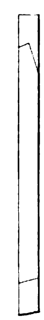


Fig. 8.—Appearance of Material After It Has Been Marked.

The Jobbing Carpenter and Some of His Work.—I.

CONVENTION OF TEXAS STATE BUILDERS' EXCHANGE.

THE ninth annual convention of the Texas State Builders' Exchange was held in the city of Houston, November 13 and 14, when representatives from various cities of the State to the number of nearly 250 met in the assembly room of the City Hall. The meeting was called to order about 11 o'clock by G. S. Shannon, acting as temporary chairman, who in a few well chosen words introduced Acting Mayor J. Z. Gaston, who extended a hearty welcome to the builders and contractors there present. D. C. McLeod, vice-president of the organization, responded to the words of welcome in the absence of President Osborne.

A Committee on Credentials composed of L. R. Wright, Frank Jones and E. J. Zimmermann, was then appointed, after which there was a 10-minute recess to allow the committee to formulate a report. When the committee reported it was found that the following delegates were entitled to seats in the convention:

Galveston—Delegates, Robert Palliser, Frank Jones, George T. Werner, R. C. Malitz and E. F. Drewa; alternates, John Egert, Fred Hartel, William Tootil, C. G. Wolfer and Charles Schlewa.

Cleburne—Delegates, M. C. Osborne and E. J. Zimmermann; alternates, J. C. Green and J. D. Johnson.

Dallas—Delegates, J. W. Slaughter, A. Watson, W. Illingsworth, Frank Hanson; alternates, S. E. Edmon, L. Jackson, O. O. Buckelew and G. W. Brillhart.

Houston—Delegates, H. F. Bailey, W. E. Woodruff and Henry Weinberg.

New Braunfels—Delegate, H. Dittlinger.

No reports were received from Waco, Austin, San Antonio, Sherman and Beaumont.

In the afternoon special cars were provided to take the delegates and their friends to the Delmonico resort on the Harrisburg road, where an oyster roast had been provided. In addition to the feast of bivalves there were speeches, dancing and various amusements.

At 8.30 in the evening the members again assembled in convention and listened to the annual reports of the various officials relative to action taken and that contemplated.

Election of Officers.

The second day's session was opened at 10 o'clock, and after considering various resolutions and selecting Cleburne as the place for the next convention, officers were elected for the ensuing year as follows:

President, D. J. McCord.

Vice-President, H. F. Bailey.

Secretary and Treasurer, H. C. Oppermann of Galveston.

Sergeant-at-Arms, E. J. Zimmermann.

Two members of the Executive Committee were elected, George Brillhart of Abilene and Frank Hanson of Dallas. These, with the president and vice-president, constitute the Executive Committee.

One of the most important matters taken up at the morning's session was the motion of Frank Hanson, who moved that the Texas State Builders' Exchange do not affiliate with the National Exchange this year. The motion was much discussed, especially that portion which related to paying the fee due to the National Exchange for the year. The reason given for withdrawing from the national body was that membership in it was of no benefit to the State Exchange, and that the time and money involved might better be expended in building up a strong State organization, as it would be of greater help to the builders of Texas than would any affiliation with the national body. It was finally decided to withdraw from the National Association of Builders' Exchanges, temporarily at least, and the secretary was instructed to take action accordingly.

The following resolutions were adopted by the convention:

Whereas, The Houston Builders' Exchange has entertained in a generous, hospitable manner the membership of the State Builders' Exchange at its present session, and has spared no efforts on its part to make our stay in its city both pleasant and profitable; therefore, be it

Resolved, That we extend our sincere thanks to the Houston Builders' Exchange and to the daily press of the city and to the citizens of Houston in general for the cordial reception we have received and the generous hospitality that has been extended us by the ladies of Houston will ever be a pleasant memory in the years to come.

Whereas, Our retiring president, M. C. Osborn, has served the interests during the last year of the State Builders' Exchange with fidelity and untiring perseverence, and the retiring officers have ever been faithful to the duties imposed upon them; therefore, be it

Resolved, That we, the Texas State Builders' Exchange, extend our sincere thanks to our retiring president, M. C. Osborn, and our retiring officers for the faithful duties they have performed.

In the afternoon of the second day the delegates met with the members of the Houston Builders' Exchange. The Houston Builders reorganized and the members of the State association met with them for the purpose of assisting and to offer words of good cheer.

After the meeting the builders were the guests of the Houston Structural Steel Company, visiting its plant and inspecting the various departments of the works.

The ladies accompanying the delegates at the convention were taken in charge by Mrs. Grant S. Shannon, chairman of the Arrangement Committee for the entertainment of the ladies.

The meeting this year was regarded as most successful in every way, and the builders enjoyed their visit to Houston to the fullest extent.

Grouping for Farm Buildings.

Two common practices that seem to prevail in grouping farm buildings on a particular site, or in placing them in relation to one another, are discussed from an economic standpoint by R. S. Shaw and I. A. Jeffrey in a recent *Bulletin* of the Michigan State Agricultural College. Among other things, they say:

Buildings are either grouped to form an unbroken line or square, or they are placed promiscuously without any definite relation one to another. It is a common practice in some parts of the country, particularly New England, to have house, woodshed, carriage building, horse stable, and other farm buildings joined in a continuous string, so that the most remote one can be reached from the house without going out of doors. Barns are frequently placed so as to form a court, three sides of a court, or an L; this is usually done to secure a yard protected from wind and have easy access to the stores of fodder in the barn and to the stack of straw in the yard.

Undoubtedly the most satisfactory grouping of farm buildings, except for danger of loss by fire, is secured by placing them in the form of a square surrounding a court. The chances of complete loss by fire are such, however, that this plan should receive careful consideration before adoption. No matter how perfect the water system to guard against fire may seem to be, it is a general rule that if a barn takes fire from lightning or other causes, it is almost certain to be completely destroyed because of the combustible material of which it is constructed, and the hay, straw and dust found therein. If barns are grouped to form a square, adequate gaps should be left at the corners of the square for fire protection; then the group is only measurably safe, even with a good water system.

ONE of the new departures in the designing of apartment houses is to have the rooms so arranged that every apartment has a front view. This is accomplished by a light court in the center of the front extending from the top of the first story to the roof. In the construction of this class of dwelling having apartments of three and four rooms, builders have usually found it imperative to arrange some of the rooms in the center, with no windows except those looking out into a central court. This difficulty has been obviated by having three separate courts—one in the front, one in the center and one in the rear. The houses appear from the front to be semi-detached but joined together at the first story up, from which the court runs.

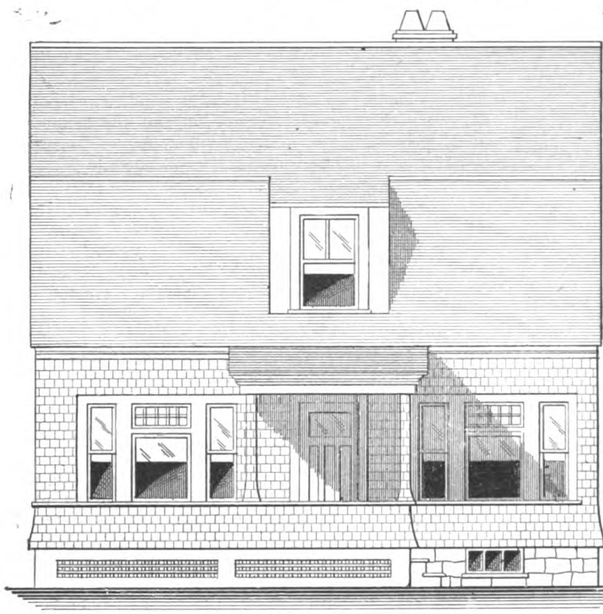
A COTTAGE OF ARTISTIC INTERIOR.

IT very often happens in connection with the subject of house design that an elaborate exterior may frequently conceal a comparatively plain interior treatment, while a plain exterior more often than otherwise forms the cover to an interior which, while not necessarily elaborate, is rich and artistic in the effects produced. The latter condition is not unusual in connection with cozy cottages, and an interesting example of such treatment is found in the home of a reader of this journal, who for the benefit of others artistically inclined furnishes the following particulars as to the general arrangement and finish. The house in question is that of Ernest Dudley Chase, Lowell, Mass., and concerning it he says:

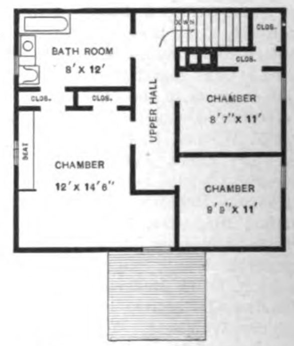
"This gambrel roof cottage, while a small house, is one capable of enlarging in an ydirection and embodies features of real comfort and homeliness. Brown stained shingles entirely cover the outside, while white trimmings afford an excellent contrast with the green foliage of numerous trees at one side and in the rear of the building. Passing through a high paneled front door, which opens from the piazza, one enters a small vestibule and thence passes directly into a large living room, which serves also as a library, reception room and parlor. The trim of this room is white wood stained a warm brown, while unplaned spruce beams of the same color with plaster between and distempered a rich ivory form a simple ceiling.

"The walls to the top of the windows and doors are paneled with ½-in. white wood cleats 5 in. wide, nailed to the plastering, the panels being papered with a deep green cartridge paper. Above this a 6-in. bric a brac shelf extends around the room, which has for a background a grayish green cartridge paper. The hangings and window seat cushions are also green, while the brown stained white wood furniture is plain yet comfortable. Mottoes and ornaments are stained and burned wherever possible. Over the fireplace mantel is a painted tapestry of a Dutch milking scene. The fireplace is made of light colored brick turning to a soft grayish hue.

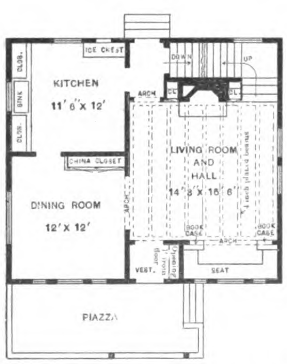
"The dining room, which is to the left of the living room, reminds the visitor of a Dutch interior. The walls are paneled, and a shelf above makes room for



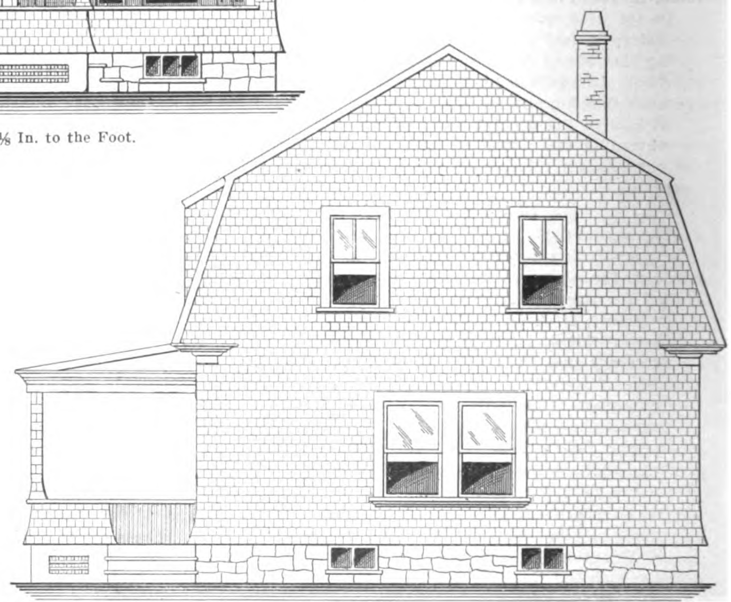
Front Elevation.—Scale, ⅛ In. to the Foot.



Second Floor.—Scale, 1-16 In. to the Foot.



First Floor.—Scale, 1-16 In. to the Foot.



Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

A Cottage of Artistic Interior.—Ernest Dudley Chase, Architect, Lowell, Mass.

pitchers, plates, steins and bric a brac. All the woodwork and furniture are stained a soft green, with designs and mottoes of a trifle darker shade. The panels are distempered a reddish brown, darker but harmonizing with the plain terra cotta frieze. A Dutch water color poster picture occupies the space in the sideboard, and over this is a leaded glass window of simple yet harmonizing design. Dishes and chinaware are of a green, which blends with the woodwork. The floor is old yellow like the living room, and the center is covered with a rug of pleasing hue.

"The kitchen and pantry combined is a well lighted room directly back of the dining room, closets and cabinets on each side of the sink facilitating cooking operations, which are done entirely by the use of gas as a fuel. The walls are wainscoted to a hight of 4 ft. from the floor, with a washable papier maché paper, and above the chair rail is a small figured wall paper.

"The woodwork of the small chamber is finished in white, and the wall paper is a small figured stripe. On the right of the hall is the bathroom fitted with open plumbing, the woodwork being enameled white and the walls a light green. Adjoining the bathroom is a large chamber, the woodwork of which is enameled white, and the wall paper a light blue stripe to an upper third, the frieze being a very light grayish blue cartridge paper."

The planning, designing and decorations of the woodwork, furniture and walls was the work of Mr. Chase, who states that the house, including the furnace, cost in the neighborhood of $2300, this amount also covering the specially designed furniture which was built to match the general scheme.

View in Living Room Looking Toward the Dining Room.

A Cottage of Artistic Interior.

The annual meeting of the stockholders of the Cement Products Exhibition Company was held on November 18 in the Commercial Bank Building, Chicago, Ill., when all the old officers and directors with one exception were re-elected. The exception was C. H. Wood, who resigned as secretary-treasurer and director, it being his intention to take an extended trip abroad during the ensuing year. C. A. Whyland of the Elk Cement & Lime Company was elected to succeed Mr. Wood as a director, and J. U. C. McDaniel, sales manager of the Chicago Portland Cement Company, was elected his successor as secretary-treasurer. The annual meeting was changed from November 18 to the second Tuesday in May.

Effects of Damp on Chimneys.

Professor Nussbaum calls attention in the *Gesundheits-Ingenieur* to the influence of the weather on the exposed walls of chimneys, and he shows that great injury is caused to the draft by the percolation of moisture, and by the neglect of precautions to render the out walls impervious. He therefore advocates the employment of a dampproof coating on the exteriors of all chimneys, and the addition of a hood or covered cap at the top, so as to exclude the rain. It is shown that when moisture reaches the inner wall of the chimney much of the useful effect of the up-rush of hot air current is expended in converting the water into vapor, and, owing to the lateral cooling of one side more than the other, in the case of lofty chimneys, eddies and counter currents are liable to be formed which greatly reduce the draft. The professor states that, as the results of practical experiments, he has found that the cost of protecting the chimney in the manner he advocates will speedily be repaid by improved efficiency.

The soundness of lumber may be ascertained by placing the ear close to one end of the log while another person delivers a succession of smart blows with a hammer or mallet upon the opposite end, when a continuance of the vibration will indicate to an experienced ear even the degree of soundness. If only a dull thud meets the ear the listener may be certain that unsoundness exists.

SOME INTRICATE PROBLEMS IN FRAMING.—I.

BY C. J. MCCARTHY.

THE work which the carpenter is called upon to perform in the practice of his trade is so varied that every form of construction is of interest and value to him. While possibly the greater portion of his time has been taken up in connection with the construction of dwelling houses, stores, &c., he is obviously desirous of obtaining an insight of the methods used in the framing of structures intended for other purposes, such, for example, as places of worship. The practical carpenter will, therefore, very likely find much that is interesting and instructive in the description and illustrations presented herewith of the manner of framing groined vaults or ceilings. I shall, therefore, endeavor to show in the clearest possible manner the methods of doing such work so that a little attention will enable any carpenter to comprehend the form and position of each timber, as well as the several methods adopted in determining them.

A groin is the line made by the intersection of arched vaults crossing each other at any angle. Cylindric groins are produced by two cylindric vaults of the same hight and span crossing each other. The intersection of equal cones produce conic groins, and the intersection of equal spheres produce spheric groins.

When the intersecting vaults are of different span the larger is called the body range, and the resulting groin is denoted by a compound word. The term for the vault of the body range is made to end in *o*, as for instance, if the body range is a cylindrical vault it becomes "clyindro," a spherical vault, because "sphero" and the intersecting vault becomes a cylindric or spheric as the case may be.

Thus a cylindro-cylindric groin is one formed by a cylindrical body range and the cylindrical intersecting vault of a smaller size.

A cylindro-spheric groin is formed by the intersection of a sphere with a cylinder of greater hight and span, while a sphero-cylindric groin is formed by the intersection of a cylindrical vault with a spherical vault of greater dimensions.

The curved surface between two adjacent groins is called a sectroid.

In rectangular groined vaults in which the openings are of different widths but of the same hight, and when one of the arches and the seats of the groins are given, to find the arch of the other openings, the groin arch and the covering of the sectroids, we proceed in the following manner:

Let A A A A of No. 1 in Fig. 1 represent the plan of the piers or imposts from which the arches spring; B C D the given arch, and O L M and P L Q the seats of the groins. The given arch in this case is a semicircle. Divide the quadrant of the given arch D C into any number of equal parts, as, for example, 1, 2, 3, 4, &c., and from the points of division draw the lines 5 *a*, 4 *b*, 3 *c*, &c., parallel to the axis C E L, to meet the seat of the groin L O. From the points L, *a*, *b*, *c*, &c., draw the lines L K G (the axis of the other vault), *a p* 5, *b o* 4, *c n* 3, &c., parallel to these, and make the lines *l* 1, *m* 2, *n* 3, *o* 4, *p* 5 and K G equal to the ordinates *k* 1, *i* 2, *h* 3, *g* 4, *f* 5 and E C respectively of the quadrant of the given arch. Then a curve traced through the points F, 1, 2, 3, 4, 5 and G will give a quadrant of the other arch.

To find the curve of the groin proceed as follows:

From the intersection of the lines C L, 5 *a*, 4 *b*, &c., with the seat of the groin M L O draw the perpendiculars *e* 1, *d* 2, *c* 3, *b* 4, &c., and make them equal to the corresponding ordinates *k* 1 or *l* 1, *i* 2 or *m* 2, *h* 3 or *n* 3 &c., and trace the curve through the points 1, 2, 3, &c. By drawing lines through the points 1, 2, 3, &c., in these quadrants parallel to their major axis and making *q*, *s*, *r*, *t* and *v x* and *u w* equal to *q* 1, *r* 2 and *v* 1 and *u* 2, respectively, continuing the curve through the points so obtained the arches may be completed.

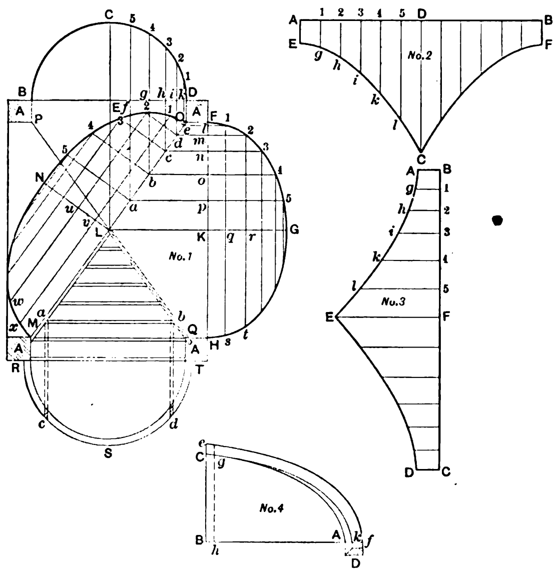


Fig. 1.—Diagrams Showing a Rectangular Groined Vault.

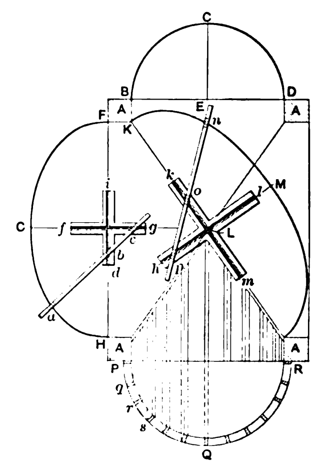


Fig. 2.—Diagrams Illustrating the Elliptograph or Trammel.

Some Intricate Problems in Framing.—I.

Then to find the covering of the smaller secroid draw a straight line as A B of No. 2 in Fig. 1 and set off the divisions 1, 2, 3, &c., equal to and corresponding with the divisions of the quadrant D C. Through these divisions draw the perpendiculars A E, 1 *g*, 2 *h*, 3 *i*, &c., and make D C equal to E L, and 5 *l* equal to *f a*. Then make 4 *k* equal to *g b*, and so on. Through the points C, *l*, *k*, *i*, *h*, *g*, *e*, draw the curve of the figure A E C D, which will be the covering of half the sectroid B P L E. By proceeding with the other ordinates, *m*, *n*, &c., in the same manner, the other half of the covering D C F B will be obtained.

Again to find the covering of the larger sectroid on the line B C in No. 3 of Fig. 1, set off the divisions 1, 2, 3, &c., corresponding to the divisions 1, 2, 3, of the greater arch F G H of No. 1. Draw the lines 1 *g*, 2 *h*, 3 *i*, &c., as before, making them equal to the lines *l e*, *m d*, *n c*, &c., in No. 1, and draw a curve through the points A, *g*, *h*, *u*, *k*, *l*, *e*. Proceed in the same way with the ordinates *m o*, *n p*, &c., of the other half and the result will be the figure B A E D C, which is the development of the covering of the sectroid as required.

On inspection of the diagram it will be observed that the angle rib L A in Fig. 1 is shown as composed of two thicknesses of stuff. It is beveled both ways so as to range with both branches of the groin. One of the thicknesses on a somewhat larger scale is shown in No. 4 of Fig. 1, in which D is the plan, the bevel being obtained on the plan No. 1 at Q. When the two thicknesses are put together the bevel face *k* A *g* will range with the surface of the sectroid M L K and the beveled face of the other piece of the rib will range with the surface of the sectroid Q L F.

In the lower part of No. 1 is shown the method of finding the places and lengths of the ribs. From the seat of any rib as *a b* draw the lines *a c* and *b d*. Then the arc *c s d* will be the rib *a b*.

The curve of the larger arch and of the groin arch in a rectangular vault, such as the case illustrated, can be very readily obtained by means of the elliptograph, or

The Gothic groin shown in Fig. 3 is similar to the one just described, and the curve of the diagonal rib is found by ordinates in the same manner. Referring to the diagram, let A A A A represent the piers as before, B C D the arch, the curve of which is already known, and K N L the seat of the groin. Divide the quadrant D C of the arch into any number of equal parts and draw from the divisions the lines 1 *k e*, 2 *i d*, 3 *h c*, &c., meeting the seat of the groin in the points *e*, *d*, *c*, *b*, *a*. Then find the larger arch as before, by drawing ordinates *e l* 1, *d m* 2, *c n* 3, &c., making them equal to the ordinates of the first arch, B C D.

To find the curve of the groin proceed in the following manner: From the points on the seat of the groin *e*, *d*, *c*, *b*, *a*, draw the perpendicular *e* 1, *d* 2, *c* 3, *b* 4, *a* 5 and N M, and make these ordinates equal to the ordinates of the first arch B C D. This operation gives only half of each arch, therefore in order to obtain the other half it is necessary to draw from the points 1, 2, 3 the lines 1 *q r*, also 1 *s t*, and the other lines parallel to F H and K L of the larger arch and of the groin arch re-

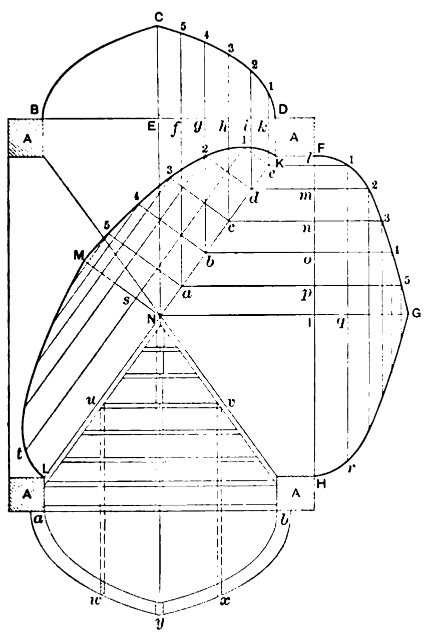


Fig. 3.—Laying Out a Gothic Groin.

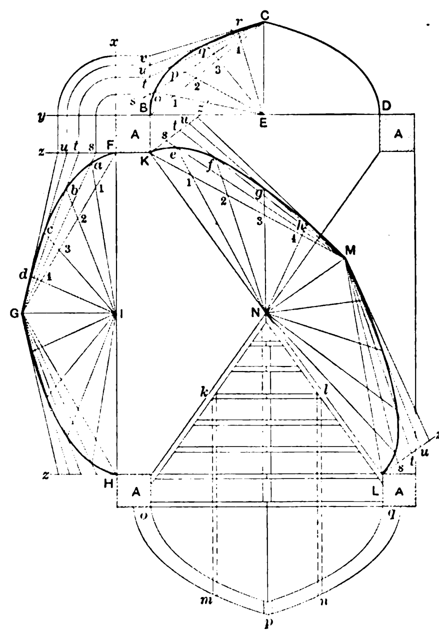


Fig. 4.—Curves Found by Intersecting Lines.

Some Intricate Problems in Framing.—I.

trammel, shown in Fig. 2 of the diagrams. In drawing the curve of the larger arch bisect the line F H, in Fig. 2, and draw the perpendicular *g f* C. Then place the center of the trammel *d g i f* upon the intersection of the lines and adjust its limbs centrally upon them; adjust the studs *a b c*, on the tracing rod, so that the distance from the tracing point to the stud *c* will be half the major axis F H, and the distance between two studs, *b* and *c* will be the difference between the semimajor and semiminor axes of the ellipse F C H, which forms the arch.

In the same way trammel the groin arch, having adjusted the studs on the tracing rod, so that from the tracing point *n* to the first stud *o* the length is equal to the hight of the arch, and to the other stud *p* equal to half the span L K.

In laying work of this kind the writer has often used with good effect a substitute for the trammel, consisting of two straight battons and a rod. When the lines corresponding to the span and hight of the arch were laid out on the floor or drawing board the battons were tacked down fair with the lines. Two bradawls were thrust through the rod in place of the studs and another used to supply the place of the tracing point. By keeping the bradawls pressed close to the battons while the rod was moving a quadrant of the ellipse was obtained.

spectively. Set off on them from the center line the points of the curve.

The lengths and places of the ribs are found as before, by drawing from the seat of any rib, as, for example, *u v*, the lines to the section of the arch *a y b* at the points *w* and *x*.

In Fig. 4 is illustrated the manner of finding arches of a Gothic groin by intersecting lines. Referring to the diagram let A A A A represent the piers, B C D the known arch and K N L the seat of the groin. Set up the hight of the large arch I G and of the groin arch N M each equal to the hight of the first arch. From B, F and K draw the perpendicular B *v*, also the lines F *z* and K *z'*. Join B C and divide the line into any number of equal parts, 1, 2, 3, 4, C. Now from E draw lines through the points of division, 1, 2, 3, 4, meeting the curve of the arch in the points *o*, *p*, *q*, *r*, as shown, and through these points from C draw lines cutting the perpendiculars B *v* in the points *s*, *t*, *u*, *v*.

To find the curve of the large arch, join G F and divide it into the same number of equal parts as the line B C in the first arch. From I draw lines through the points of division and then transfer the divisions of the perpendicular B *v* in the first arch to the line F *z* in the large arch, as shown by *s*, *t*, *u*. Now from G draw lines to these divisions intersecting the lines drawn from I. The intersections give the points through which the curve is to be traced.

Proceed in the same way in drawing the groin arch. Divide the line K M into the same number of equal parts as B C; draw through the divisions the lines N *e*, N *f*, N *g*, N *h*, and intersect these by lines drawn from M to the divisions *s*, *t*, *u*, *z'* on the line K *z'* transferred from B *v*. The intersections will give the points through which to draw the curve. The positions and lengths of the ribs are found as before by drawing lines from the seats of the rib *k l* to the section *o p q*, when *k l* gives the position of the rib, and *m p n* its length.

Cleveland Sheet Metal Apprenticeship Agreement.

At the last meeting of the Sheet Metal Contractors' Association of Cleveland, Ohio, a very important action was taken with reference to the subject of apprentices, and as a direct result of the efforts of the so-called Apprenticeship Committee, which has been grappling with this question ever since early last summer, the report of the committee and the apprenticeship contract recommended by it have been prepared in printed form for distribution among its members and the trade at large. How well the committee has acquitted itself in this responsible matter, a perusal of the two articles will illustrate. The next step will be to place both propositions upon a working footing, and when this is accomplished it may confidently be expected that the old era of haphazard employment of unskilled mechanics will gradually become a thing of the past. The report is as follows:

Report of Apprenticeship Agreement.

Your Apprenticeship Committee has, after considerable time and study, come to the conclusion that a sufficient number of good and competent mechanics can be assured only through a proper apprenticeship system, this system should not only give a boy a practical, but also a technical, knowledge of the trade. With this object in view, the committee recommends to the members of our association the universal adoption of the accompanying form of the apprenticeship agreement, which should be entered with the boy's parents or guardians, as the case may be.

In addition to the carrying out of the general terms of this contract we would recommend that the following rule in the employment of the apprentice be followed out, as near as the individual case in hand may permit:

1. No apprentice shall be engaged under 16 years of age, and none but boys who have at least passed the seventh grade of our Public Schools.

2. Care should be taken to employ none but boys of good moral character and reasonably good physique.

3. We believe in the compulsory study by the apprentice of such courses as are now available in the Young Men's Christian Association or our present new Technical High School. We believe that the employer should encourage such study on the part of the apprentice by bearing the financial expense of same. We have taken the matter up with the officials of the Young Men's Christian Association and have attached to this report a written statement from them as to what can be done in this line.

4. With the above careful selection of the quality of a boy for apprenticeship, we believe that the wages paid should be sufficient to attract such boys to the trade, and we believe that the employer would be amply repaid by the efficient services rendered under this system. We therefore recommend as follows that the wages be fixed at:

First year	$5.00 per week.
Second year, first half	5.50 per week.
Second year, second half	6.00 per week.
Third year, first half	6.50 per week.
Third year, second half	7.00 per week.
Fourth year, first half	8.00 per week.
Fourth year, second half	9.00 per week.

The above to be the minimum wages fixed in the contract.

The employer to be allowed, however, to reward particularly good services on the part of the apprentice, by additional compensation. The employer should create a fund, out of which should be paid the apprentice at the expiration of his contracted term of apprenticeship, a sum of equal to $1 for each week worked of his contracted term of apprenticeship, at which time his employer shall issue to him a journeyman's certificate, in which the employer shall set forth the time served.

Your committee believes the carrying out of the above recommendations and the systematic employment of a goodly number of apprentices each year will, in course of a few years, solve our vexing labor problem and supply our membership at all times with not only a sufficient number of workmen, but with a force of men highly proficient in their trade and who will at all times be a credit to themselves and their employer and who will command the respect of the public.

Respectfully submitted, A. E. Riester, chairman; E. F. Aunger, H. H. Lind, J. S. Harrison, G. J. Wehrly, Committee on Apprenticeship.

Terms of Apprenticeship.

This Agreement, made this............day of......19...
between ....
of the city of Cleveland, of the first part, and..............
....
parent or guardian of.......................................
of the said city, of the second part,

Witnesseth, Whereas the said..........................
is serving an apprenticeship of four years with the said party of the first part at the following rate of wages—namely:

	Per week.
First year	$5.00
Second year, first half	5.50
Second year, second half	6.00
Third year, first half	6.50
Third year, second half	7.00
Fourth year, first half	8.00
Fourth year, second half	9.00

And whereas, it is recognized as advantageous to both parties that the said apprentice should continue with and faithfully serve the said parties of the first part during the term of said apprenticeship, which will expire..........................

Now, this agreement witnesseth, that the said............
..............., parent or guardian of said................
apprentice as aforesaid, does hereby agree with said party of first part that...
shall in all respects faithfully serve the said................
and to the best of his knowledge perform such work and duties as he may be directed to perform for the said...............
for the entire term of said apprenticeship.

In consideration whereof, the said......................
do hereby agree to create a fund, out of which they will at the end of the term of said apprenticeship pay the sum of One Dollar for each week the said apprentice shall have worked from the date thereof until the end of such term.

Provided, and it is expressly understood and agreed, that should the said apprentice be discharged at any time for failure to obey the directions of the said...........................
or its proper agents and managers, or should he fail to faithfully serve the said..
during the entire period agreed upon of his apprenticeship, that then and in either case he shall not be entitled to receive any portion of said fund, and the agreement shall in such event become null and void. And in no case shall the premium hereby agreed to be paid be considered as wages.

Provided further, that the said apprentice shall attend school ....evenings per week, and be subject, while there, to the same conditions as though such attendance were necessary to enable him to learn the trade, providing..................
furnish him free tuition.

It is understood and agreed that all necessary instruments and supplies required in prosecuting his studies shall be furnished by the apprentice at his own cost and expense.

Provided further, that the use of intoxicating liquors by the apprentice during said period of apprenticeship shall be sufficient reason to annul this agreement.

Provided further, in the event of.......................
desiring to discontinue the business, or should their requirements not be sufficient to give steady employment to the apprentice, it is mutually agreed by both parties that this agreement shall be discontinued by the said.................................
paying to the said apprentice a sum equal to One Dollar per week for the number of weeks said apprentice has worked.

In witness whereof, the said parties hereto have hereunto set their hands and seals, the day and year above written.

Signed, sealed and delivered in the presence of	.... (Seal) Parent or Guardian. of .... By .... Employer.

Laying Slate Over Old Shingle Roofs.

A roofing method that is becoming extensive is referred to as follows in the *Slate Buyers' Bulletin*, a publication of the E. J. Johnson Company, 38 Park row, New York, which has been in the slate business for 25 years. Thousands of wood shingle roofs are wearing out monthly. These can be covered with slate without removing the shingles by using our standard No. 1 slate of good thickness, either 20, 22 or 24 in. long. Saw the shingles off close to the rake of the roof and nail a molding over the sawed edge, so that when slates are laid the edge of shingles will be covered. The same plan may be followed along the eave. Another method may be followed by nailing roofing lath on top of the shingles on which to nail the slate. Either of these methods avoids the expense and annoyance connected with tearing off the old shingles and the results are perfectly satisfactory.

The idea of covering old shingle roofs with slate is a growing one and should be pushed by all slate roofers, as it opens up large additional business to them. So many thousand home builders are so blind to the wood shingle situation that they will continue to put them on and in a few years have them wear out, whereas, a slate roof in the beginning would obviate the trouble and expense of two roofs.

MAKING A METAL COVERED DOOR.

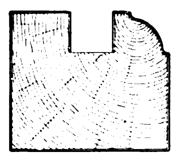
BY C. T. RICHARDS.

THE making of metal covered doors or Kalamein work, as the term is ordinarily understood, is considered a trade secret and jealously guarded by the many workers in that line. Its use has grown astonishingly and requests for information regarding the manner of doing work, regarding the machines required and regarding the materials used are frequent. While it is true that added numbers of people have engaged in this work in recent years, much of the advancement made has been possible only through experiment. Much of the Kalamein work is now giving way to stamping which requires larger and more expensive machines and a greater capital outlay. Its use may be said to be widening daily, not only in expensive and lofty office buildings, where many of the doors are of sheet metal, or Kalamein work, but moldings and office trim are likewise made of this material. In a line of furniture its use is also growing, many cabinets or cupboards for keeping records being either of Kalamein work or stamped work and replacing fire resisting vaults on the ground that it would take either a very disastrous general fire or a severe one in the room in which the records are kept to destroy them.

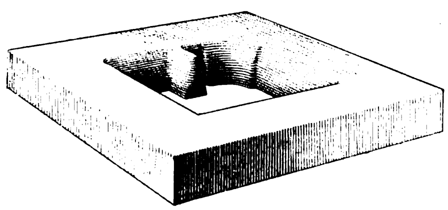
The process of developing Kalamein woodwork was one of evolution, the first attempts in that direction being the metal covered fire doors much after the pattern used to-day. These were satisfactory for mill work and partitions between buildings, but on account of their inelegant appearance could scarcely be used for hotels, office buildings and apartment houses. The first metal covered paneled door was the product of a woodworking factory and not a sheet metal shop. In 1893 or thereabouts E. M. Pitchard of Mott Haven, a part of New York City, took out letters patent for a wooden door covered with asbestos and sheet metal. This door was used to a considerable extent, and at least one notable proof is on record of its fire resisting qualities. In the early 90's three paneled doors of this character were placed in the brick partition between the main portion and the L of the post office building in Plainfield, N. J. The main part of the building, which was a three-story brick and frame structure of the ordinary construction, was burned, and left a total wreck in so much that heavy steel and iron girders were found in the débris twisted and almost unrecognizable. The three doors, however, which were located in the brick fire walls on the three different floors, effectively prevented the fire from spreading into the wing, and clearly saved that portion of the building. When the doors were taken out, after having been subjected to the fierce heat, it was found that they were little damaged except the one on the third floor, where the fire was hottest, due to the lack of water pressure preventing the fire streams from reaching the flames on that floor. They were in such good shape, however, that they were afterward refinished and used when the main building was rebuilt.

Although these doors were called Kalamein construction, that name is somewhat of a misnomer, the metal in this case being formed on a cornice brake and sprung into place. After the use of a draw bench the moldings and panels, however, became products of Kalamein work. Later the use of the draw bench became more general. It is clear, however, that the early ones were built of wooden framing, with only the carriage, dies, drawing apparatus and chains of iron or steel.

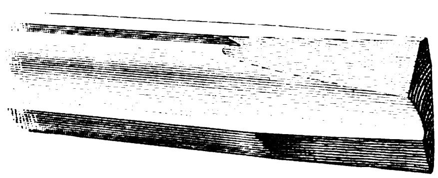
The machinery required for making Kalamein work consists in the main of the ordinary squaring shears, slitting shears, &c., such as are used in a sheet metal shop, and in addition a draw bench. The draw bench is a simple machine. One which is representative of the type is shown on the following page. In this power is applied to a belt at the pulley A and is transmitted by gearing to the chain B. This chain carries the clamping device which is shown at C, while the die rests at the point D. A die such as is used in making moldings for metal covered window frames is shown in one of the cuts as well as the outline of the molding, the heavy line showing the metal covering of the wood. It will be noted that the die, as in practically all other dies, has a larger opening at one end than the other. This is to enable the



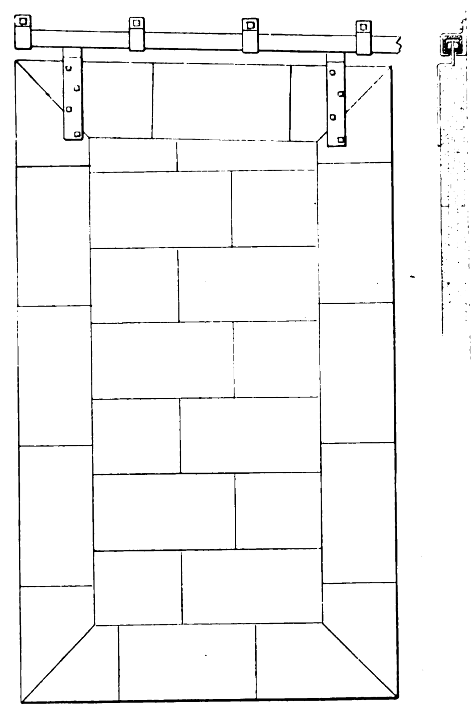
Section of Metal Covered Frame.



Die for Wrapping Wooden Frame with Metal.



Chamfered End to Wood for Entrance Into Die.



Mill Construction Door of Terne Plate.

Making a Metal Covered Door.

metal and wood to be fed easily into the die and fit it snugly.

The principal requirement of draw benches is one of strength and easy clamping. Some minor attachments are also convenient, such as having a rail at the side so that the operator can watch the action of the metal drawing through the die and at the same time control the action of the machine. Sometimes machines are so equipped that the jaws will return to the other end of the machine at a triple speed. In certain kinds of work dies having two parts are used. This is especially true in covering door stiles. In the majority of cases where wood is to be covered with metal one end is chamfered down. For instance, in a molding the end is cut off somewhat as shown in one of the sketches, and the metal is bent around it and the whole pushed loosely through the die, after which the jaws are clamped to it and the wood and metal are drawn through the die, making the metal hug the wood as tightly as necessary. Of course this can be accomplished by having a die made in two parts, and it is often more convenient to do it in that manner. Dies used for covering door stiles are now almost invariably made in two parts. In intricate work it is oftentimes necessary to make a few preliminary bends in the metal by means of the cornice brake.

The advantages of this form of construction over ordinary woodwork are not confined to the fireproof qualities, for, if the work is properly done, it presents a much harder surface and one not subject to the denting and scratching of the ordinary woodwork. Then, too, it gives a surface which can be readily finished to imitate any desired wood. While its cost exceeds that of practically any kind of hardwood, the difference is so slight as compared with the advantages gained that it is becoming less and less of a factor. The success of at least one company making hollow door and sheet steel office devices in enameling their wares suggests many other possibilities in this line. Used for stair rails and other interior work, it has the advantage of being put together by carpenters and sheet metal workers and formed on the job, whereas cast iron and bronze, formerly so extensively employed for this purpose, requires either special castings and patterns or the fitting of the metal parts at some well equipped machine shop. For interior work this material does not correspond to wood, and comparisons should be made with iron, steel, stone and marble, it having fireproof qualities equal to them at a fraction of the cost.

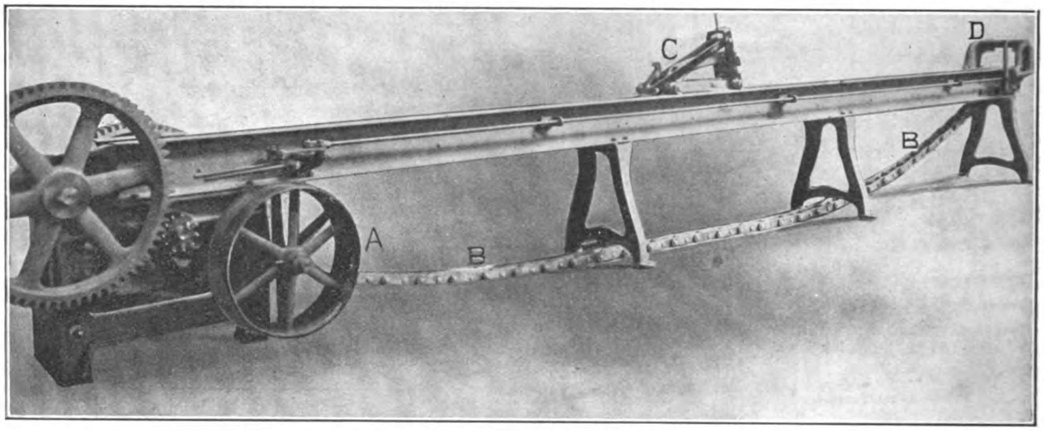
The making of doors is one of the particular problems of the Kalamein worker of to-day, and in consequence the history is somewhat interesting. The first doors made were fire doors, that is, heavily battened doors covered with terne plates. As made now in order to conform with the requirements of the Board of Fire Underwriters they are made of three thicknesses of wood, each layer placed at right angles to the adjacent one, a section being shown in the accompanying illustration, the tin likewise being laid on as is there shown. Doors of this character are effective as fire preventives, but are not artistic enough to be used in many elevator shafts, office buildings and doors separating apartments from the main hallway.

In consequence there was a demand for the panel door and the first of this style was made by Mr. Pitchard. An illustration of his general style of door is shown on the first page of the article. While a panel one and metal covered, it was not a Kalamein door in the sense of to-day, as the metal in this case was formed upon a cornice brake and sprung on the door. Then, too, it lacked considerable in ornateness compared with the doors of to-day. In the middle panel is a row of bolt holes. These were covered by metal covered molding fastened in place by nails. Structurally the door was as solid a one as could be desired, the top, bottom and lock rails being bolted to the stiles and the bolt heads countersunk and then covered with metal. In addition to the sheet metal covering of the wood the door had sheets of asbestos between the wood and the metal, making it effectually fireproof.

The ordinary style of door as made to-day is shown on the last page of this article. The top and bottom rails of this door are the entire width of the opening and the stiles shorter than the ordinary length. This is so that a lag screw can be placed through the top rail, bolting it to the stile after the door is made. In this case every part of the door is metal covered before being put together, excepting the points marked A, which were the ends of the rails. It is impossible to fit these in at the time of manufacture, owing to their being end pieces. These, however, are afterward covered, the metal being placed in position and sometimes soldered to make a tight fit. There would be no objection to soldering the metal in such places, for should a fire break out when the door is closed it would be held firmly in place in the door casing, and if the door is open the metal covered one would be of no advantage anyway. The section of the door on the line B B illustrates the degree of metal covering and also the method of inserting the panels, the panels being covered the same as the stiles and other portions. The stiles and rails are cut so that they can be assembled together and drawn up tightly by the lag screws at the four corners. Of course in this style of door it is necessary to cover the corners or joints between the panel rail and stiles with molding.

In some cases the panels used are not wood covered but are large stampings. One reason for this is that it is difficult to make the metal hug the wood tightly if so large a flat surface is exposed. Doors of this kind are a combination of stamping and drawn work. When such doors are made of long terne plates as is generally the case, they can be finished in almost any style.

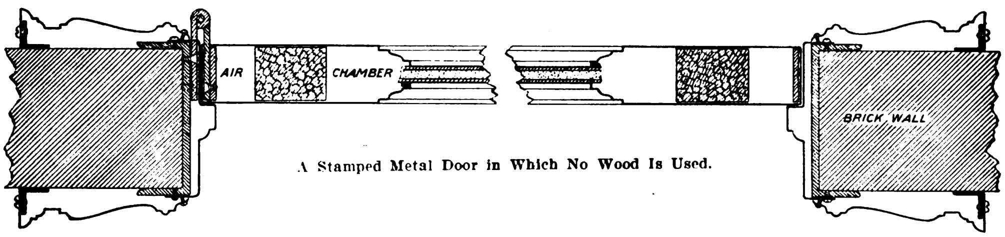
Stamped metal doors made up of two pieces have found considerable favor with architects, more especially



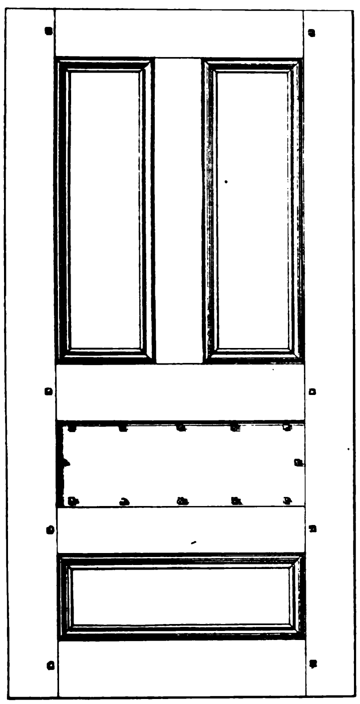
Draw Bench Used in Forming the Metal Covering.

Making a Metal Covered Door.

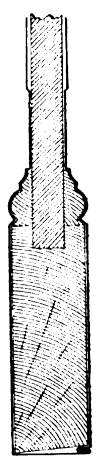
since these doors can be enameled and the enamel backed on, making it possible to imitate practically any style wood desired and also solid bronze. Many of these doors are patented, and the accompanying illustration shows a section of one made by the Dahlstrom Metallic Door Company, Jamestown, N. Y. In this illustration it is likewise well to note that the way play can be secured in the opening—that is, the moldings at the opening can easily be made a trifle wider if necessary, and thus necessity for making odd sizes can in a considerable measure be avoided. The company making these doors seems to possess many advantages for turning out special forms of work, and it regularly makes sheet metal moldings



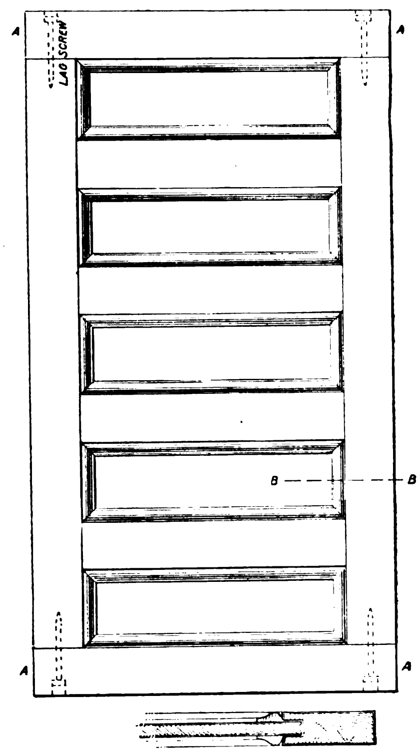
A Stamped Metal Door in Which No Wood Is Used.



An Early Metal Covered Door.



Stamped Door, Covering Wood.



ENLARGED SECTION AT B B

A Modern Paneled Door, Metal Covered.

Making a Metal Covered Door.—Miscellaneous Details, Showing Construction.

without any wood underneath. The moldings are of course made of heavier metal than ordinary Kalamein work, and are used by furniture manufacturers and in the building of all-steel cars. The car builders are large users of such material, and also Kalamein work, especially on interurban cars. The Pennsylvania Railroad Company is now building a number of all-steel cars. A stamped panel door is made by John W. Rapp, New York City, and one designed for a wood interior is shown in the accompanying illustration. It will be seen in this case that dies large as an ordinary door must be used, and the metal is then forced on over the door. The method of joining the two parts of the door is indicated in the lower part of the illustration, the bottom of the door being beveled to allow for the double seam.

Plumbing Alterations.

In making extensive plumbing alterations it is wise to have a comprehensive plan prepared before letting the contract. The advantages of having well prepared plumbing plans and specifications are seven-fold, says a competent engineer on this subject. There are many men of financial responsibility engaged in the plumbing business who do not possess sufficient skill and knowledge to properly lay out a system, and, unless the plans are full and complete and the specifications explicit, these men cannot intelligently estimate on the work; consequently, they will either refuse to figure the cost or will estimate so high as to be out of the contest. If, on the other hand, the plans and specifications are so well prepared that nothing is left to conjecture which can be shown, described, or explained, the architect and owner will have the benefit of responsible competition and will secure a better installation.

FRANCIS H. FASSETT, Portland, Maine, the oldest and one of the most distinguished architects of Maine, died November 1, aged 85 years. He designed many of the public buildings of his city and State, and during the latter years of his life he was associated with Edward F. Fassett in the practice of architecture.

SOME PROBLEMS IN STAIRBUILDING.—IV.

By MORRIS WILLIAMS.

THE method of laying out the wreath for the 10-in. cylinder of the well hole shown in Fig. 19, connecting the two flights at the half space landing platform is shown in Fig. 29 of the diagrams. Draw the plan of the center line of rail. Draw the elevation of the steps adjoining the cylinder of both the bottom and upper flight, as shown at 12 and 16 in Fig. 29. Over these steps draw lines to represent the pitch of the straight rail of the two flights, and continue the center line as shown over and above the cylinder. In this case it will be observed that we have the same pitch over the cylinder as over the straight flights, which is a condition due to the diameter of the cylinder, 10 in., being equal to the width of the 10-in. treads of the adjoining flights. Now place the compasses in *b*, extend to *a*, turn around to *n*, and on *n* erect the line *n* 1. Again place the compasses in *d*, extend to *f*, turn around to *m*, and erect the line *m w*. Upon *c* erect the line *c* 4. From *h* draw the line *h* 2 5 square to the pitch line and placing the compasses in 3, extend to 1; draw an arc to 5 and connect 5 with 3. Draw a line from 5 to 0′ parallel to the axis square to the minor axis through the point 0′. Make 0′ *a* on the minor axis equal to the radius 0 *a* of the plan in Fig. 29, and on each side of *a* measure a distance equal to half the width of the straight rail, thus determining the width of the face mold on the minor axis, which in all cases of face mold developments is to equal the width of the straight rail. To find the width of the mold at the ends 5 and 4, it will be necessary first to find the bevel or bevels required, as the case may be, by means of which the wreath is squared or "twisted." In diagram E of Fig. 29 is shown how the bevel is found. In this case only one bevel will be required. Make 0 *a* in the diagram equal to the radius 0 *a* of the plan curve, make *a* 2 equal in length to the line *h* 2 in the elevation and connect 2 to 0. The bevel will be found at 2, and it is to be applied to both ends of the wreath. Now draw the

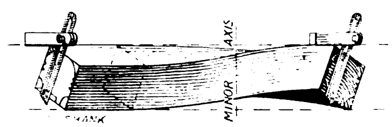
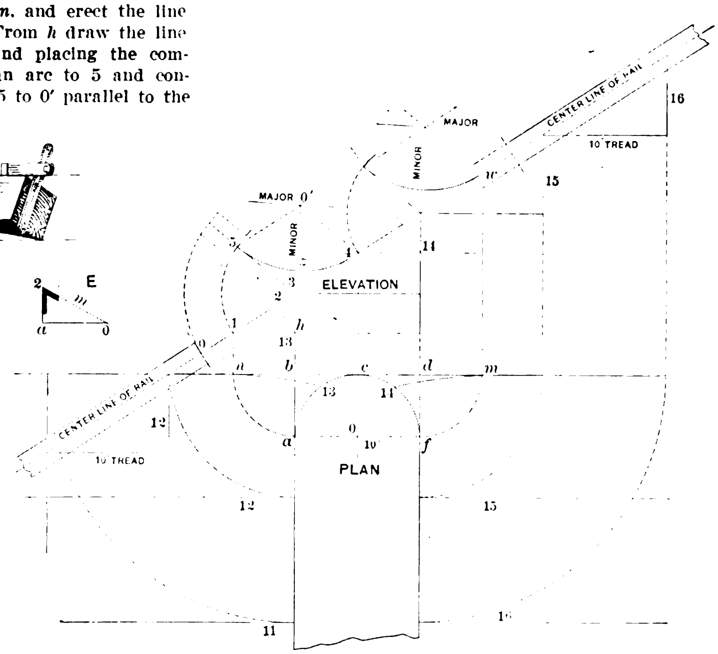


Fig. 31.—View Showing How Bevels Are Applied and Wreath Squared.



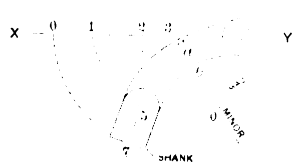


Fig. 30.—Laying Out Face Mold for 10-In. Well Hole Cylinder Rail.

Fig. 29.—Plan, Elevation and Development of Tangents and Center Line of Rail for the 10-In. Cylinder of the Well Hole.

Some Problems in Stairbuilding.—IV.

line 3 4, and draw a line from 4 to 0′ parellel to the line 3 5. Now connect 0′ 3, which will be the minor axis, and through 0′ and square to the minor axis draw the major axis, as shown. Measure from 0′ to *z* on the minor axis a distance equal to the radius 0 *a* of the plan. Now take a flexible lath, bend to touch the points 4, *z*, 5, and trace the curve of the center line of the wreath.

In the foregoing process we have shown how to develop the central line of the portion of wreath that is to wind around over and above the bottom quadrant of the cylinder, shown in the plan from *a* to *c*. In the diagram is also shown the development of the central line of the upper portion of wreath that is to wind over and above the plan quadrant *c f*. Both processes, it will be seen, are alike.

In Fig. 30 is shown how the face mold for the two portions of wreath is layed out. Draw the straight line X Y, as shown, and transfer to it the points 0, 1, 2, 3, 4, from the pitch line in Fig. 29. From 2 draw the line 2 5 square to the line X Y. Place the compasses in 3, extend to 1 and draw an arc to 5; connect 3 5 and extend to 7. From 5 draw the line 5 0 parallel to the line 3 4. From 4 draw the line 4 0′ parallel to 3 5. Connect 3 and 0′, which will be the minor axis. Draw the major short line shown at *m* in the diagram across the bevel at a distance from the line *a* 2 equal to half the width of the straight rail. Take the distance 2 *m* along the long edge of the bevel on the compasses and draw the semicircles shown in Fig. 30 at 4 and at 5. The diameter of these semicircles indicates the width of the mold at each end. To draw the curves take a flexible lath, bend it to touch the semicircles at each end, and the point *b* on the minor axis for the inside curve of the mold, and again bend it to touch the semicircles, as shown, and the point *c* for the outside curve. Draw the shank, as shown, from 5 to 7, thus completing the development of the face mold.

In Fig. 31 is shown a view of the wreath after it is squared and the bevels applied to each end.

In Fig. 32 is shown how to get out the curved rail for the 5-in. quarter turn at the upper end of the top flight, connecting with the level rail of landing on the second floor. From 0 in the plan draw the plan curves of the quarter turn rail as shown, revolve point *a* to *m* on the ground line, and upon *m* erect the line *m n*. Upon *b* erect the line *b b′*, and upon *c* the line *c c′*. Draw the elevation of the steps 19 and 20 adjoining the quarter turn, and upon the apex of these steps draw the center line of rail of the flight to b'. From b' through c draw the center line of the level landing rail. Now from b' as center, b' c' as radius, revolve point c' to s. From s draw the line s $0'$ parallel to n b', and the line n $0'$ parallel to the line b' s, both these lines to be square to the pitch line n b'. The bevel for this wreath is shown at b', and the development of the center line of the rail is shown from n to s.

A very simple method to lay out the face mold for the wreath is shown in Fig. 33. Draw the square $0'$ n b' s equal to $0'$ n b' s of Fig. 32. Make the mold at n the same width as that of the straight rail, and at the end s make s z and s z equal to the distance b' z, shown on the long edge of the bevel in Fig. 32. Bisect n b in 2, as shown. Make 2 1 aud 2 3 equal to 2 1 and 2 3 shown across the plan curve of the rail in Fig. 32. Now bend a lath to touch the points z, 1 and a in Fig. 33, and trace the outside curve of the mold. Again, bend the lath to touch the points z, 3 and a, and trace the curve for the inside of

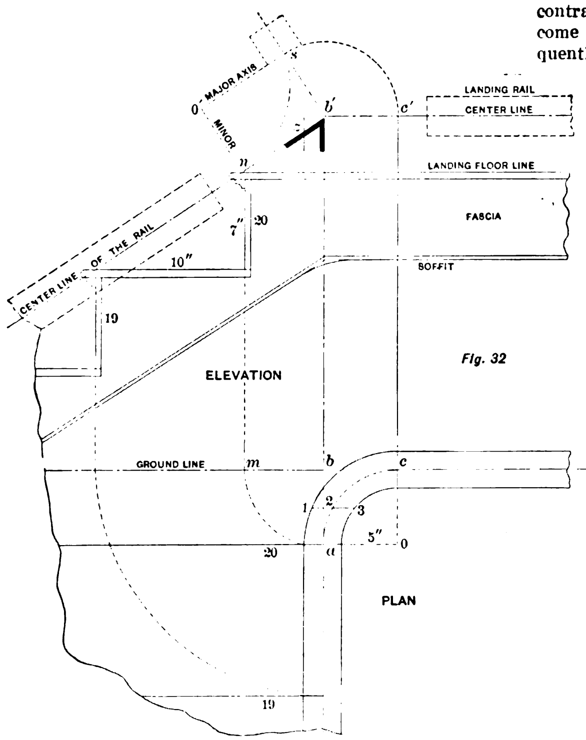


Fig. 32.—Plan and Elevation of a Few Steps Connecting the Quadrant Turn and the Second Floor Landing.

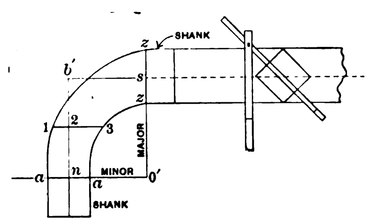


Fig. 33.—Method of Laying Out Face Mold with Ordinates.

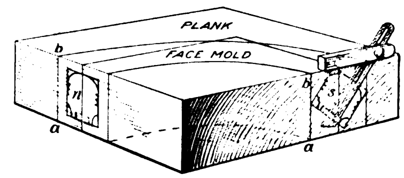


Fig. 34.—Face Mold Shown Applied to Plank.

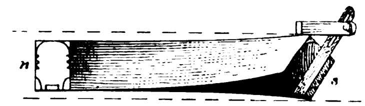


Fig. 35.—Showing the Wreath Squared and the Bevel Applied at One End.

Some Problems in Stairbuilding.—IV.

the mold. The bevel is shown applied to the end s by holding the stock parallel to the joint and the blade directed toward the outside. No bevel is required at the end n, owing to it being on the minor axis. The face mold is shown applied to the plank in Fig. 34, and the wreath cut out square to its face, as shown along the lines a b, &c. At the end s the bevel is shown applied and a section of the rail is drawn to indicate how by means of the bevel the wreath is twisted. At the end n no bevel is shown applied, as none is required.

In Fig. 35 is shown a view of the wreath after it is squared, showing the application of the bevel at the end s and no bevel at the end n.

Opportunities of the Plasterers' Trade.

The plasterers' is a most attractive occupation for any young mechanic to study who has artistic tastes and a desire to build himself up for future advancement. The pay of the practical plaster expert is good and always will be. For the man who will study materials, their mixtures and combinations, the treatment of surfaces and modeling of relief work, there is practically no limit to the possibilities for advancement, says *Rock Products*. The treatment of cement mortar exteriors is already an interesting study to the architects. They complain that it is difficult to secure plasterers who know enough about the manipulation of the necessary materials to secure the expressions that they want to design and specify. This constitutes a whole field as yet scarcely touched, and certainly must be soon developed to keep up with the progress of the age.

Decorative work would be used to a much greater extent if it was possible to secure the physical work of putting it in place according to original plans. A prominent architect recently said: "You would be surprised to know the great amount of modifications that we are constantly called upon to make in plaster specifications for the simple reason that it is next to impossible to get the work done according to the design in anything like contract time. The plaster subcontract must of necessity come in about the completion of the work. This is frequently after much time has already been lost, so that there is no further latitude or margin of time to be lost. The plaster work is too often rushed. Probably there can never be a remedy for this evil—it seems to be a part of the natural outcome of many contractors working on the several parts of the job. Nevertheless there is no end of an opportunity for better informed material experts and practical workmen who understand all the variations of treatment for the good, bad and indifferent surface for laying plaster upon.

"There would be more money spent for fine plaster jobs if the contractors could supply plenty of workmen who are capable of turning out first-class work."

ONE of the notable building improvements in the vicinity of New York City is the new woolen mills to be erected on the Passaic River at Garfield, a suburb of Passaic, N. J., estimated to cost $800,000. It is stated that 6,000,000 bricks and 2000 tons of steel will be among the materials required for the construction. The architect in charge of the work is Charles Heuses. The contract is being executed by the John W. Ferguson Construction Company, New York City.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - TREASURER
GEO. W. COPE, - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

JANUARY, 1909.

A Mammoth Apartment House.

In looking over the local building records for the year just closed one cannot have failed to notice the number of important building improvements projected for the city involving a vast outlay of capital, and this notwithstanding the fact that the aggregate of building operations for the year is considerably behind that of the preceding 12 months. The permits issued have not by any means been confined to towering structures for the strictly business sections of the metropolis, but have covered improvements in the residential portions consisting in many instances of apartment houses involving millions of expenditure. One of the latest of these is the apartment house, known as the Belnord, which will cover the entire block bounded by Broadway and Amsterdam avenue on the one hand and Eighty-sixth and Eighty-seventh streets on the other, and which will rise to a hight of 150 ft., or 12 stories. According to the plans just filed by Architect H. Hobart Weekes the building will cover an area 350 ft. long and 200 ft. wide, will be of the Rennaissance style of architecture, and built of gray limestone at the first two stories and brick with terra cotta trimmings above. The main entrance will be at the Eighty-sixth street front, finished with a double driveway leading to an interior court, which will be 250 ft. long and 100 ft. wide. It will have large grass plots and ornamental fountains, and will constitute a playground for children for whom special provision has also been made in the building. The driveway will be paved with oak blocks to deaden the sound. From this court six large entrances will open into the main hallways of the building, each entrance being equipped with an elevator arranged for the exclusive service of from two to four suites on each floor. There will be a subway court beneath the main court lighted with skylights and gratings, with an entrance opening in Eighty-seventh street, which will be for the special use of tradesmen. The structure will cost $1,800,000, and will contain 175 suites, each 50 ft. deep and embracing from 9 to 14 rooms, finished in mahogany and other ornamental hardwoods and decorated in the style of Louis XVI.

Complaints of Apartment House Heating.

The fact that both the Commissioner of Health of New York City and the Tenement House Commission receive during the season when the heating of buildings is required thousands of complaints from those who rent apartments with the heat supplied by the landlord that the heating is insufficient is evidence that the landlords fail to fulfill their contracts and that the heating plants installed are more satisfactory in first cost than they are in their qualification to supply the heat required. With the laws as they exist in New York State suits which have been carried through the courts, they show that the tenant is practically at the mercy of his landlord, though it has been found that if he should sue for damages from insufficient heat, it is also necessary for him to move from the apartment to collect damages, for it is held that it is inconsistent for him to occupy the apartments and collect damages for dissatisfaction with the service rendered in them. Those who have suffered have sought the influence of united effort to secure legislation which will afford relief or redress and make it incumbent upon those who own buildings which they agree to heat to supply the heat requisite for comfort. While there may be some difference in opinion as to the heat required for comfort on account of some people requiring a much higher temperature than would be agreeable to others, this point will hardly be likely to cause any trouble on account of the generally accepted 70 degrees as the proper temperature for living rooms. When so large a number of complaints are filed with two public departments as in New York City, it is evident that there is a need for some change in the laws which will be in the interest of the people rather than to let those laws remain on the statute books which seem to be all in the interest of those who derive a monetary benefit seemingly through the shortage in the service contracted for and paid for. Investigation has already demonstrated that the high price of coal is frequently given as the reason why the steam heating apparatus is not started up early in the season and continued late in the spring, and also for the failure to maintain sufficient heat in the building during the cold spells, to say nothing of the fact that fires are banked so early in the evening as to allow the house to cool off while those who occupy them have a right to enjoy their use without suffering from the cold. Possibly the influence of the competent heating engineers would be beneficial. It is a matter of common information that the disposition to save in first cost reduces the amount of radiation used below the line of safety, and the same desire selects a heater of a capacity which will only do the work in ordinary weather and which possesses no reserve power for the exceptionally cold day. Such a plant will clearly use more coal than one of more generous proportions in the same building. When complaints to the extent recorded in the city departments are made it is the opportunity for those identified with the heating trade to utilize these complaints to influence such installations as will in a large measure remove the cause for complaint.

Employers' Interest in Apprentices.

While the claims of this or that method of training young men in the industrial trades are being urged, and comparisons are being made between manual training schools, trade schools and industrial courses in public and special schools, one thing stands out in the new apprenticeship movement. It is the interest everywhere being taken in the question by employers. Whatever might have been said a few years ago of the indifference of proprietors to the bringing up of a new supply of mechanics, there are evidences now of a very lively concern. We read, for example, of a series of evening meetings at which in turn manufacturers of machinery in a New England city are to discuss with the boys who are now taking combination shop and high school training in that city practical questions connected with shop operations. In the two important organizations of employers in metal working lines the training of a new supply of workmen is a leading topic at every annual convention, and time has been devoted unsparingly by members to whom this subject has particularly appealed to the working out of the apprenticeship plans originating with these associations. It goes without saying that if the same amount of attention had been given to apprentices 20 years ago, or 10 years ago, the situation would be far better to-day. But that is not to the point, which is that if the intelligent work now being put on the problem by employers is kept up, the next 10 years will tell a very different story from what has been heard of late as to the supply and quality of workmen in the industrial trades.

Convention of Minnesota State Association o Builders Exchanges.

The sixth annual convention of the Minnesota State Association of Builders' Exchanges was held in the rooms of the St. Paul Builders' Exchange, December 9, great interest being manifested in the proceedings by the representatives from affiliated bodies throughout the State. After more or less routine business and the appointment of committees, President J. W. L. Corning delivered his annual address, which was followed with the closest attention. He stated that the membership consisted of 566 firms representing 44 cities and towns and urged the establishment of exchanges in Winona and Red Wing, as well as a greater representation of the towns throughout the State. An important feature of the speaker's remarks related to a better defined legislation in the matter of employers' liability in case of accident. He cited the general compensation law of foreign countries and recommended some federal law on the subject. He also referred to the interest which was being manifested in industrial education and to the work which has been accomplished through the State of Minnesota. He also recommended that the State Board of Control of Minnesota open bids publicly at the hour given for receiving them, and also urged the preparation of a uniform building contract.

The president was followed by George M. Gillette, who spoke in favor of the extension of an organization of employers of the State, and also referred to the question of employers' liability along with other topics affecting their relations with their men.

The meeting then adjourned for luncheon, which took the shape of an informal banquet at Carlings, where nearly 100 representatives of the building and allied industries were served. After full justice had been done to the good things provided, President Rhodes of the local exchange, welcomed the representatives of the State exchanges to the hospitality of the St. Paul Exchange. Responses were made by representatives of the affiliated bodies.

In the afternoon the business session was resumed with a consideration of the report of the Committee on Industrial Education. State aid, it was pointed out, had been extended to trade schools in three States—New York, Massachusetts and Wisconsin—but they have not been in operation for a sufficient period to determine the value, and it was not recommended to seek an appropriation. It was, however, recommended to work for the naming of a commission from the Legislature to investigate conditions and the needs of such work. The committee favored the extension of mechanical drawing and manual training and of giving more time to these subjects in the schools as well as including them in the lower grades. The committee which considered the points raised in the president's address favored industrial education and uniform building contracts; investigating the foreign laws on uniform liability and petitioning the State Board of Control to open and publish bids at the time set for receiving them.

Various resolutions of thanks were then adopted, while a special committee on the question of legislation presented a recommendation for the incorporation of the Minnesota Employers' Association as a means of presenting legislation of a constructive character.

Officers for the ensuing year were then elected as follows:

President, J. W. L. Corning, St. Paul.
First Vice-President, S. G. Tuthill, Minneapolis.
Second Vice-President, R. A. Webster, Duluth.
Third Vice-President, A. D. Blodgett, Jr., Faribault.
Fourth Vice-President, O. H. Olson, Stillwater.
Secretary-Treasurer, A. V. Williams, St. Paul.

Architect E. P. Bassford of St. Paul was recommended for the next vacancy on the State Board of Control in accordance with a resolution presented by Timothy Reardom, the veteran builder. It was decided to hold the convention of 1909 in Minneapolis, Minn.

Massachusetts State Association of Master Builders.

The annual meeting of the Massachusetts State Association of Master Builders was held November 18 in the rooms of the Builders' Exchange, 518 Main street, Worcester, Mass., there being present representatives from various affiliated bodies. The question of industrial education was considered at some length, a most interesting address being presented on the subject by H. C. Wood, after which a committee of five was appointed to assist in the extension of the work of industrial education.

The committee appointed consisted of President A. B. Murdough of Watertown, H. N. Gragg of Waltham, John J. Jackson of Brockton, B. C. Fiske of Worcester and Frank P. Dillon of Milford. The following officials were elected for the ensuing year:

President, A. B. Murdough of Watertown.
First Vice-President, Frank P. Dillon of Milford.
Second Vice-President, Fred M. Osteyee of Pittsfield.
Treasurer, B. C. Fiske of Worcester.
Secretary, H. M. Sweetser of Worcester.

Directors were also elected for two years and auditors were also chosen.

Meeting of Portland Cement Manufacturers.

At the sixth annual meeting of the Association of American Cement Manufacturers held in New York City, December 7, 8 and 9, the following officers were elected for the ensuing year:

President, John B. Lober.
Vice-President, Edward M. Hagar.
Treasurer, E. R. Ackerman.

Delegates were present from 25 States and interesting papers pertaining to the Portland cement industry were presented. Some valuable data was given as to the cost of manufacture, and reference was made to the capital required to establish a plant upon a profitable basis. It was also stated that at present there are 93 mills for the manufacture of Portland cement, operating in 25 States of the Union.

Buffalo's Industrial Exhibition.

The Manufacturers' Club of Buffalo, N. Y., has made arrangements for an industrial exhibition to be held in Convention Hall, December 14 to 19, to be participated in by all the local manufacturers, to demonstrate the varied and extensive lines of industrial productions in Buffalo and to increase the patriotic interest of its citizens in the consumption of goods "made in Buffalo." Almost every inch of space in the large hall has been allotted to exhibitors, who are arranging to install working exhibits. The decorations are designed to be a prophecy and illustration of Buffalo—busy, but smokeless—and aim to show that a city can be busy without polluting the air, and that this condition is especially possible in Buffalo by electric power. The booths will be equipped with large brick chimneys, and the general effect will be of the representative industries of the city run at full blast, but with not a particle of smoke from the chimney stacks. The Manufacturers' Club aims to help bring about an era of cheaper electricity.

CORRESPONDENCE.

Why the Fireplace Smokes.

From The Philadelphia & Boston Face Brick Company, Boston, Mass.—On page 406 of the December issue of *Carpentry and Building* there is an inquiry from "F. B.," Bolton Landing, N. Y., regarding a smoky fireplace. In our opinion the trouble is with the shape of the chimney flue just above the firebox opening, and we think if he will cut away the brickwork and make it so that it will follow the outlines we have indicated on the sectional elevation presented in Fig. 1 the draft will be much improved. Our idea is to cut away enough of the brickwork so as to form a little ledge or shelf as shown by the line A B on the sketch. The point B should be about 4 in. to 6 in. higher up than the point C.

The 33 in. hight of the opening may possibly be too much for the 30 in. width of the opening. We would suggest to the correspondent that he try fitting a piece of wood or iron 4 in. or 5 in. high across the top of the opening, so as to bring its hight down to about 28 in. or 29 in. This would probably improve the draft, and if so the hight of the opening could then be decreased permanently by inserting two rows of brick across the top of the opening.

We are not absolutely sure that this change would make the draft all right, but we have known of a very large number of cases where it has proven to be just the remedy required.

From L. K., Cragsmoor, N. Y.—In answer to the inquiry of "F. B.," in the December issue, I would say that there are several reasons why the fireplace smokes, and I am afraid it will have to be built over. The fireplace opening is too high. It should seldom be over 2 ft. 6 in. high, and in this case as the opening is quite narrow 2 ft. 4 in. would be better. The throat is too wide, as it allows a down draft to pass the up draft. In no case should be throat be wider than 3 in. This causes the heat and smoke to be drawn together so the up draft will fill the throat and does not allow the cold air to pass down through it. There should be a wind break 5 in. wide back of the arch and 6 in. above it. The bend should not be in the smoke chamber, but above it. For a fireplace 2 ft. 6 in. x 2 ft. 4 in. the flue should have been 8 x 10 in., as it is generally made about one-tenth the area of the fireplace opening, but if "F. B." wishes to build the fireplace over without tearing down the chimney he will have to have the 8 x 12 in. flue. This will do no harm where the chimney is not very high, except that there will not be quite as much heat thrown into the room.

I am sending a sketch of the fireplace, Fig. 2, as it should be built, showing face brick up the front as high as the shelf, but these are not necessary and could be left out entirely.

As I have built quite a number of fireplaces and have never had one smoke, "F. B." need not hesitate following the drawings. If there are trees near the chimney and higher than it there should be a stone on the top, as shown, otherwise the stone is not necessary, if good Portland cement is used for the top courses of masonry.

The fireplace problem seems to be general. We seldom see one built properly, as most masons don't know how to build one, and most architects don't know how they should be built. On page 386 of the December issue of *Carpentry and Building* will be seen sketches of a fireplace, which if followed would be sure to smoke.

While I am writing I wish to say that *Carpentry and Building* the past year has been especially instructive and entertaining, and I wish to thank the contributors of the various articles. I believe it would be of great benefit to most of us if at some time we were to have an article on the care and sharpening of the tools used in the building trades. What do the other readers think?

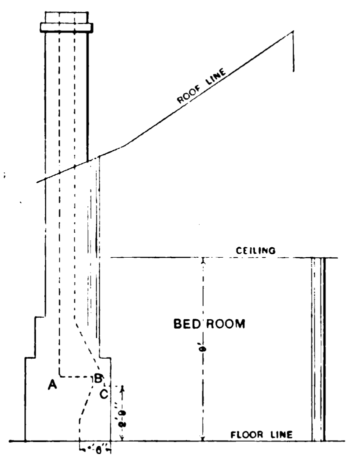


Fig. 1.—One Remedy Suggested for the Trouble.

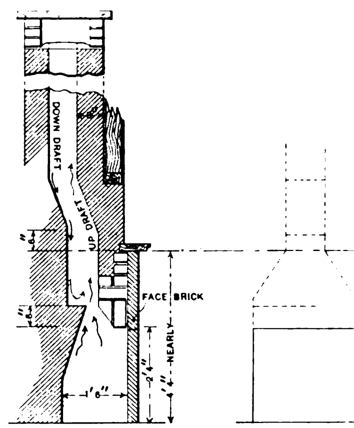


Fig. 2.—Another Scheme of Overcoming the Difficulty.

Why the Fireplace Smokes.

From a Brother Carpenter, Bonesteel, S. D.—I notice in the December issue of the paper that "F. B.," Bolton Landing, N. Y., has trouble by reason of his fireplace smoking, and as I had a somewhat similar experience this last fall in connection with a house I built for an Indian, I will offer a suggestion which may be of service to the correspondent. His trouble is this: The choke is 2 ft. 6 in. by 5 in., which gives a total of 150 sq. in. The chimney flue is 8 x 12 in., making 96 in.. a difference too great to give satisfactory results. If he will reduce the choke to say 2 ft. 6 in. by 2 in. he will have 30 sq. in., and his fire place will draw very much better, and will, I am quite sure, obviate the smoking of which the correspondent complains.

From J. S. A., Orange, N. J.—In the December issue "F. B." inquires why his fireplace smokes. I will endeavor to tell him by stating that the throat of the chimney opening into the fireplace should have a flare, so that the opening from the fire should be larger at the bottom than the chimney, and should taper so as to form a neck. By way of illustration, if you take a bell and put on top of it a piece of pipe making it funnel shape, the pipe being the upper part of the chimney and the bell being the throat, you prevent the smoke from being thrown

into the room for want of space. In writing specifications I have often called for the use of a patented throat made of iron which has given general satisfaction in small fireplaces. What I would say in addition to the above concerning the particular chimney of the correspondent is that the fireplace is entirely too small to be satisfactory. Fireplaces about the size of that of "F. B." are for ornament rather than practical use.

From William Whitney Lewis, Architect, Boston, Mass.—The chimney complained of by "F. B.," Bolton Landing, N. Y., in the December number, ought to smoke for one reason if for no other. The simple fact is the cross section of an 8 x 12 in. flue lining is altogether too small in area to make an effective draft for a fireplace opening 2 ft. 6 in. x 2 ft. 9 in. A fireplace with that sized opening requires a flue area of approximately 100 sq. in. or a flue 10 x 10 in., inside measurement.

A flue lining 13 x 13, outside measurement, would be suitable for this case, but as the chimney is already built the practicable thing is to reduce the size of the fireplace opening, leaving the width as at present, but making the hight only 2 x 2 in.

If the room lacks a sufficient supply of fresh air through a register or other source, the draft in the chimney flue will of course be sluggish. If the relative hights of the chimney stack and the adjacent roof are such that air is compressed and drives down the smoke, that would be an additional source of trouble, also the wind might be deflected by the slope of the roof on the opposite side of the ridge to the chimney, and then simply pour into the top of the flue. A suitable chimney pot would probably improve matters in such a case.

Finding Length of Rafter.

From C. J. M., St. Johns, Newfoundland.—In regard to the inquiry of "W. H. J. P.," Philadelphia, Pa., in the October issue of the paper, I assume that what the correspondent wants to know is where or on what line to lay off the length of the rafter on the piece of timber. I am inclosing a sketch, Fig. 1, which I trust will, with a few words of explanation, be of service to him.

After the first plumb line is marked on the rafter it makes no particular difference where the length is laid off so long as it is on a line parallel with the back. The usual method is to mark the upper plumb cut where the rafter meets the ridge board, as at *b* of the sketch; then lay off the length along the back from *b* to *a*. Mark the plumb cut at *a*; then mark the notch where the rafter fits over the wall plate.

What is meant by the "working line" is the dotted line *c d* drawn along the side of the rafter from the bottom of the notch parallel to the back of the rafter; but this line is of little service to the workman, whose care should be to have the plumb distance from *a* to *c* the same in all his rafters, which amounts to the same thing.

It often happens in repairing or remodeling old houses or in places where the plates do not run parallel with the ridge, and where the rafters cannot be spaced equally, that no two rafters are of the same length. It is then the practice to take the measure of each rafter in turn from the place where it is to go. To do this take the length from the top of the ridge to the outer corner of the plate, as from *b* to *c* of the sketch. Mark the working line on the timber, or as much of it as is required. Mark the upper plumb cut and lay off the length as shown by the dotted line *b c*. Where this length crosses the working line, as at *e*, is the length of the rafter.

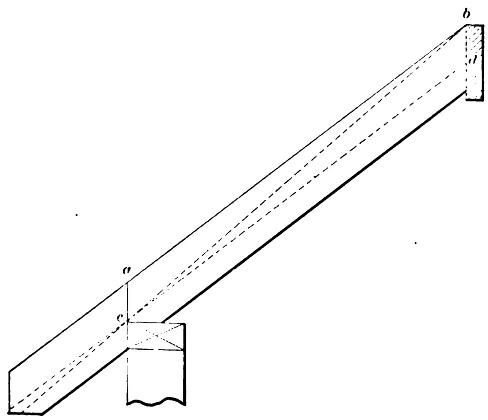


Fig. 1.—Sketch Submitted by "C. J. M."

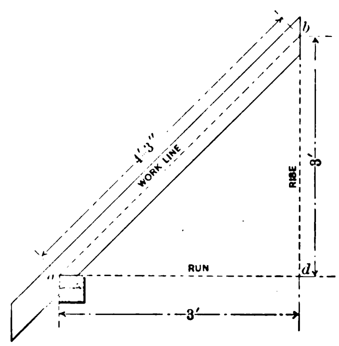


Fig. 2.—Diagram Accompanying Letter of Mr. Pitts.

Finding Length of Rafter.—Methods of Two Correspondents.

Ventilation of Cesspools.

From G. A. P., Essex Junction, Vt.—I would like your ideas and practical knowledge in regard to cesspools dug in the sand from 10 to 15 ft. deep, walled with loose stones to a point within 3 ft. of the ground surface and covered with 3-in. oak planking, covered in turn with dirt. Is there any danger from such cesspools that are vented through the house roof if there is no house trap? Which would be the more sanitary, such cesspools not trapped or a sewer system not trapped? Is there any danger arising from such cesspools, providing they are properly trapped and due sanitary precautions are taken when such cesspools are opened for any reason?

Answer.—There are three considerations with a cesspool such as that described. 1. There is the danger of contamination of the water supply, either of the immediate locality or of some water supply which derives its source from underground channels that are fed from the sand strata.

2. There is the apparent danger of bacterial propagation of disease, through freedom of air circulation unhampered by traps, although the danger from this source is shown to be very remote through the researches of the Sanitary Committee of the National Association of Master Plumbers, as reported at the July convention in Boston.

3. Danger comes from the fact that the gases given off in the septic processes are largely combustible, and if intimately mixed with a sufficient amount of air form an explosive mixture which will burn with the great rapidity that defines an explosion if ignited by a light of any kind, the force of the explosion depending upon the volume of the hydrogen, hydrogen sulphide and the like, and on the proportions of the combustible gases and the air. It will thus been seen that the absence of a house trap not only tends to allow of a delivery of obnoxious smelling air into the house, but affords an opportunity, particularly if the house is closed for any length of time, for the development of an explosive mixture.

An untrapped sewer is perhaps neither more nor less sanitary than an untrapped cesspool. One of the dangers apt to exist with an untrapped sewer is the presence in the sewer of gas leaking from the illuminating gas mains, and while illuminating gas, as ordinarily understood, has a characteristic odor which is its own warning, the result when illuminating gas percolates through the soil between a gas pipe and a sewer is that the hydrocarbons which give it its odor are filtered out, allowing the odorless carbon monoxide to reach the space in the sewer and thence into the house. This is the particular poison in illuminating gas, and it is its insidious character that makes it advisable to have trapped sewer connections even if no danger is felt of contamination through sewer gas proper.

From T. J. Pitts, Greenview, Ill.—I herewith submit an answer to the inquiry of "W. H. J. P.," Philadelphia, Pa., which appeared in the October number of *Carpentry and Building*. Referring to his sketch in the issue named. I would say that the length of the rafter obtained from the point *a* to the point *b* would not give correct results, but the length obtained from the point *a'* to the point *b* would give them.

The proper way, however, of finding the length of a rafter is to measure it along what is known as the "work line," but as the correspondent does not apparently understand what is meant by it I shall try to make it clear in the following comments. Referring to the sketch sent herewith, Fig. 1, the dotted line *a b* represents the work line of the rafter and shows so clearly what it is that extended comment would appear to be unnecessary. It will be observed that it starts from the top outside corner of the plate and runs parallel with the top of the rafter.

In regard to finding the length of a rafter the simplest method I have ever tried is to take the run on the blade of the steel square and the rise on the tongue, then measure diagonally across from the point on the blade to the point on the tongue. If this operation is correctly performed the result will be the true length of the rafter. The terms "run" and "rise" are clearly illustrated in the sketch where *a d* is the run and *d b* the rise.

The correspondent above will probably derive valuable information as to the method of finding the length of a rafter by the use of the steel square by carefully reading the replies on this subject which appeared in the November issue of the paper.

Another method of finding the length of a rafter is based on the principle of a triangle, calling the run the base of the triangle, the rise the altitude and the length of the rafter would be the hypotenuse. Any one who has studied arithmetic knows that the square root of the sum of the squares of the two sides of a triangle is equal to the hypotenuse of a right angle triangle. This is a good way by which to test the accuracy of the first method.

Laying Out Face Mold for Stairway with Side Wreath and Easement.

From P. P., Akron, Ohio.—I am sending a sketch showing partial plan of a stairway with side wreath and easement, and would like to have Morris Williams or some other expert in this line tell me how to lay out the face mold for it; state the thickness of stock required and give any suggestions that would naturally be of value in connection with work of this kind. It has an open string 7¼ in. rise, 9 in. run, and the easement starts at *c* of the sketch. The newel rests on a pedestal 21¾ in. high serving as a column to support the beam over an arch, the other supporting column being 5 ft. 8 in. to the right as viewed on the plan.

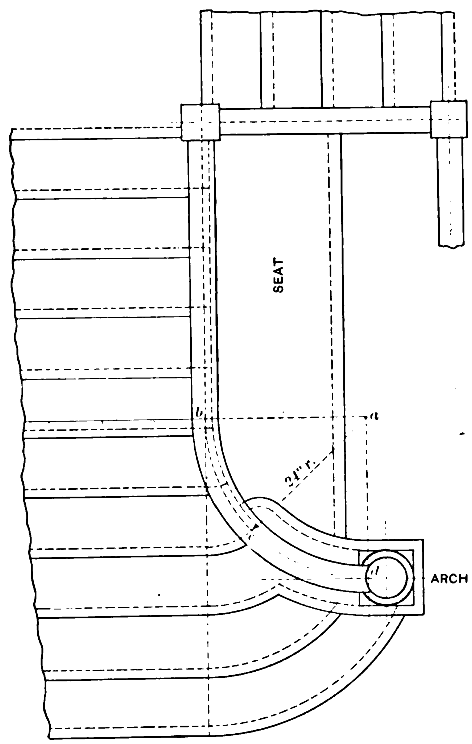


Fig. 1.—Reproduction of Correspondent's Sketch.

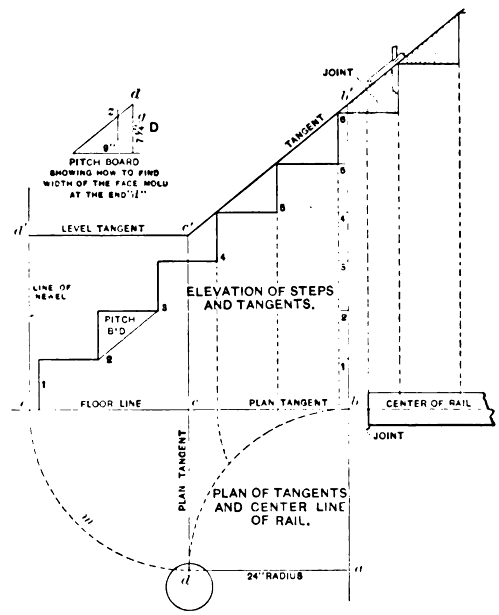


Fig. 2. Diagrams Showing Plan of Tangents with Center Line of Wreath; Also Elevation of Tangents and Steps.

Laying Out Face Mold for Stairway, With Side Wreath and Easement.

Answer.—The inquiry above was submitted to Morris Williams, who furnishes the following reply:

In the sketch of the correspondent Fig. 1 shows the flight starting on the first floor from a newel post with what is known as a stretchout curve having a radius of 24 in., the curve being a full quarter circle. In Fig. 2 is shown the plan of the center line of the wreath reproduced from Fig. 1 extending from *d* to *b*. In Fig. 2 is also shown the plan tangents, the elevation of the steps contained in the curve and the elevation of the tangents. This diagram should be drawn full size preparatory to the laying out of the face mold, and as the steps within the curve are uniform with those of the straight flight they may be laid out with the pitch board in the ordinary way of laying out the steps on a straight piece of board for a common straight flight. Fig. 2 shows that the curve contains six risers and that the springing plan line *a b* of the curve continued to *b'* in the elevation is at a definite distance from the sixth riser, cutting the pitch line in *b'*. The two steps shown shaded above *b'* are those of the straight flight, and are drawn merely to obtain the pitch of the flight, which if continued downward through *b'* to intersect the plan tangent *d c* prolonged to *c'* determines the pitch and length of the elevation of the plan tangent *b c* as shown from *b' c'* on the pitch line.

To find the length of the elevation of the plan tangent *d c* place one leg of the dividers in *c* and extend the other to *d*, turn over as shown by the arc *d m e* to the ground line. Upon *e* raise the perpendicular line *e d'* and from *d'* draw a level line to *c'*, which will be the elevation of the level plan tangent *d c*.

The line *e d'* represents the inside face of the newel, and the distance from *e* on the floor line to *d'* where the level tangent cuts the line *e d'*, indicates the hight from the floor of the center line of the wreath upon the newel, which, as shown, is equal to the hight of 3½ risers, 7¼ in. each, a total of 21¾ in., and is the same hight as the pedestal upon which the newel is said to rest.

By adding to this dimension the length, 26 in., of the short baluster, the exact hight of the center of rail from the floor is found to be 47¾ in.

To lay out the face mold proceed as indicated in Fig. 3 of the diagrams. Draw the square *a b c d*. Make the sides *a b* and *c d* equal in length to that of the level tangent *c' d'* of Fig. 2, and make the sides *a d* and *b c* equal in length to that of the raking tangent *c' b'* of Fig. 2. The line *c d* in the square, Fig. 3, will be the bottom level tangent, and the line *c b* the upper raking tangent of the wreath. The angle between the two shown at *c* will be the angle between the tangents as required on the face mold to give the correct direction to the tangents to square the joints of the wreath. The joint at *d* is to be made square to the level tangent line *d c*, and the joint at *b* to the line *c b*, which, as before said, represents the upper raking tangent.

The line *d a* of Fig. 3 will be the major axis, and the line *a b* the minor axis of the elliptical curves that constitute the form of the face mold.

To draw the curves of the mold, we place at each side of *b* on the minor axis, a distance equal to half the width of the straight rail, as shown at *b* 1 and *b* 2 respectively. This determines the width of the face mold at the end *b*.

To determine the width at the end *d*, place on each side of *d*, as shown at *d x* and *d z*, a distance equal to *d z* of the diagram *d*, Fig. 2, which is the pitch *b d* of the stairway. The line *z g* in the same diagram is made equal to half the width of the straight rail.

To find the foci of the ellipses, that is, the points on the major axis to place the pins in order to describe the curves, take the distance on the major axis from *a* to *z* on the dividers, the point 1 on the minor axis for a center, and describe the arc *m* as shown to cut the major axis in the points *w* and *w*. Again place on the dividers the distance from *a* to *x* on the major axis and taking the point 2 on the minor axis for a center, describe the arc *n*, cutting the major axis in the points *y* and *y*.

To draw the inside curve of the face mold place pins at the points *w* and *w* on the major axis and a pin at 1 on the minor axis. Tie a piece of string or wire around the three pins and fasten it tight to the pins at *w* and *w*. Take off the pin at 1 and in its place fix a pencil and sweep the curve as indicated from 1 to *z*.

By the same process the curve for the outside of the mold is described, but the pins are to be fixed at *y* and *y* on the major axis and at 2 on the minor axis for the outside curve.

At the end, *b*, of the mold is shown a short piece of straight rail measuring 3 in. from *b* to the joint, and is called the shank. At the end *d* is shown the bevel applied toward the inside to square the wreath.

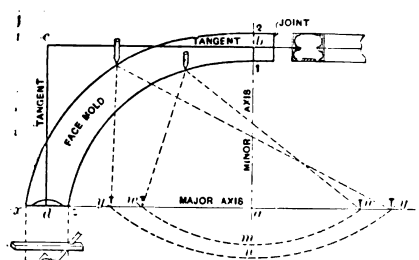


FIG. 3

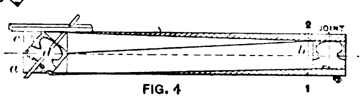


FIG. 4

Fig. 3.—Method of Laying Out Face Mold by Means of String and Pins.

Fig. 4.—Appearance of Wreath After It Is Squared and Showing Application of Bevel to the End *d*.

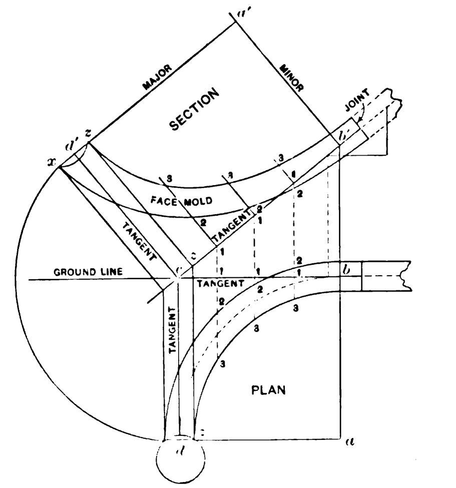


Fig. 5.—Diagram Showing Simple Method of Laying Out the Face Mold with Level Lines or "Ordinates."

Laying Out Face Mold for Stairway, With Side Wreath and Easement.

In Fig. 4 is a view of the wreath after it has been squared, also the application of the bevel to the end *d* and a vertical section of the rail at the end *b*, showing that no bevel is required at that point, owing to its being, as shown in Fig. 3, on the minor axis.

The shaded portions in Fig. 4 indicate the slabs to be taken off in squaring the wreath and the lines *a c* and 1 2 the thickness of the plank required.

Respecting the thickness of plank required for wreaths generally, it may be stated that the safe rule is to inscribe the finished section of the rail within a circle, the diameter of the circle in all cases will define the thickness of plank required.

The bevel shown at *d*, in Fig. 4, is also presented in Fig. 2, where it is shown to be the upper angle of the pitch board.

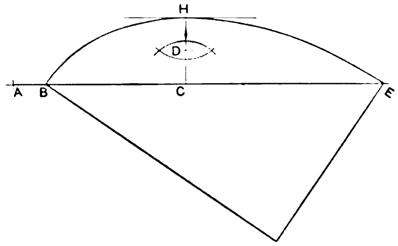
A simple method of laying out the face mold with level lines or "ordinates" is shown in Fig. 5. First draw the lines *a*, *b*, *c*, *d*, representing the square plan; then the plan of the curved portion of the rail as shown from *d* to *b*. Place the pitch board at *c* and draw the pitch as indicated from *c* to *b'* and beyond to the joint. From *c* draw *c d'* square to the pitch line *c b'*. The line *c d* of the plan is a level line and the line *c d'* of the section is also a level line, both lines being termed "directing ordinates."

Next draw lines across the curved plan of the rail parallel to the plan level line *d c* up to the pitch line *c b'*, all as shown. From the contact points of these lines with the pitch line *c b'* draw lines parallel with the level tangent line *c d'* of the section and make them all equal in length to their corelative lines in the plan. For example, make 1 2 3 extending across the face mold equal to 1 2 3 from the ground line across the plan curved rail, and so on with all the lines across the plan rail and across the face mold.

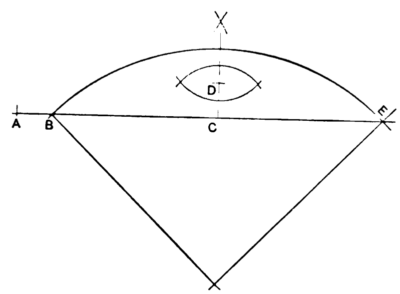
Trace the inside curve of the face mold through the points 3, 3, 3, *z*, and the outside curve through the points 2, 2, 2, *x*. Make the joint at *b'* square to the raking tangent line *c b* and at *d'* to the level tangent line *c d'*. The same bevel will apply and the same thickness of plank will suffice for the wreath as laid out in this figure as those found for the wreath shown in Figs. 3 and 4.

Finding the Perimeter of An Ellipse.

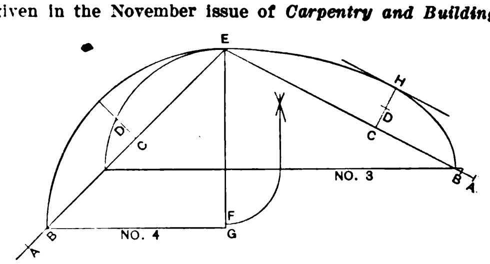
From J. V. H. Secor, Newark, N. J.—I am sending herewith sketches showing my method of finding the perimeter of an ellipse resolved to a circle. I trust it will be of some use to those who do not understand algebra as well as to the correspondent who originally made the inquiry. The formula is the same for ellipse or circle, and I have lettered all the diagrams alike. Draw the chord E B extended; for ellipse draw a tangent parallel to the chord, and at the intersection with the curve as at H divide the space in two equal parts, letting B A of the chord equal C D. Then A E is the perimeter absolute.



No. 1.



No. 2.



Nos. 3 and 4.

Finding the Perimeter of an Ellipse—Sketches Accompanying Letter of Mr. Secor.

Finding the radius of a circle from the axis of an ellipse will not give the correct length of the chord by which to find the perimeter from the formula. Apply as shown in No. 3 as both circle and ellipse in that case should be equal. The error is shown at F G in Nos. 3 and 4. I would say that No. 2 is drawn from the ratio of the ellipse No. 1, but the perimeters are not the same in both.

Another Veteran Reader's Opinion of Carpentry and Building.

From F. D. Crandall, Architect, Sturgeon Bay, Wis.—You have doubtless been told so often of the good impression that *Carpentry and Building* makes on every one who sees it that I will simply say I have been a great admirer of the journal for the past 26 years and consider it the best of its kind published to-day.

Finding Bevels in Truss Construction.

From J. M. V., Providence, R. I.—Although it may seem a little late in the day to send in an answer to the problem of "J. A. K.," which appeared in the April issue of your journal, relative to finding the intersecting line or bevel between the straining beam and brace in a truss with the steel square; yet I wish to offer the following solution, which is easy and perfectly accurate.

Rule.—Subtract the run from the length. Take the remainder on the tongue and the rise per foot on the blade, and the tongue will give the desired bevel.

Example.—Suppose the rise per foot to be 9 in. from the diagonal of 9 and 12, which is 15; subtract the run. Take the remainder, 3, on the tongue, and the rise on the blade, and the tongue will give the bevel.

In this case, as in many others, the square can be better applied by doubling the figures, using 6 in. and 18 in.

Constructing and Hanging Sliding Doors.

From J. T. Brown, Osgood, Ind.—Will some brother craftsman kindly tell in a practical way through the columns of the paper how to construct and put up sliding or traveling doors, either double or single. I have put up quite a number myself and been told of many different ways, still I have had very little trouble with doors I erected, but have repaired some that were quite out of shape and found it hard to get at others in order to repair them without removing a portion of the walls. As I am a new reader of the paper, which I consider very valuable to the craft, and take great interest in the Correspondence Department, I come to the veterans asking them for something practical and up to date. Any reader who will reply to my inquiry from a practical standpoint will be conferring a favor upon me, and doubtless upon others in the trade who may be similarly situated.

Practical Value of the Correspondence Department.

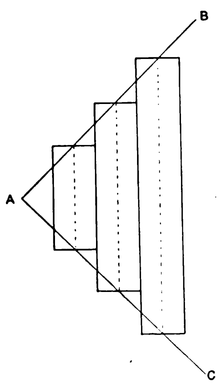
From N. M. B., Fort Smith, Ark.—I have made a trial of the instructions for repairing veneer work as given in the November issue of *Carpentry and Building* on a piece of birdseye maple damaged almost continuously for a distance of more than 10 ft. I finished it all at one time and in such a satisfactory manner that not one of the damaged places can now be located. I have several more which I shall treat in the same way. I desire to take this opportunity of thanking the editor so far as it is possible to do so not only for the information vouchsafed, but also for the promptness with which it was given. This, I am sure, will be regarded as striking testimony of the value of the Correspondence Columns for the dissemination of valuable information for the benefit of the craft.

Design Wanted for General Contractor's Cabinet.

From H. R. S., New Ulm, Minn.—Will some of the readers of the paper who have had experience in making bookcases for general contractor's purposes send a design for publication in the Correspondence columns. I want something suitable for a general contractor to contain his books and catalogues, drawing paper and plans, while at the same time he could use it for writing and making drawings. It should not be wider than 5 ft. The hight is immaterial. It should be attractive in appearance so as to form an ornament to the room in which it may be placed. I want to make one for myself this winter, but I did not seem to be able to find just the suggestions I wanted. There are so many readers of *Carpentry and Building*, and each has ideas of his own, that I come to the Correspondence columns for help.

Calculating Diameters of Cone Pulleys.

From N. L. B., Tacoma, Wash.—In the October number of *Carpentry and Building* "J. P. A.," Camden, N. J., requests information regarding the manner of calculating diameters of cone pulleys for a three-step foot power lathe. There are two ways in which this can be done depending on whether or not the belt is crossed or uncrossed. If he intends to use a crossed belt the cone is laid out, as shown in Fig. 1 of the sketches, where it is seen that the steps of the cone are equal and that the lines A B and A C drawn through the centers of the faces of the two end steps also intersect the center of the faces of the middle steps.



Calculating Diameters of Cone Pulleys.—Fig. 1.—Laying Out Cone for a Crossed Belt.

Assuming that it is desired to use a main drive wheel of 28.5 in. diameter and that the steps of the cone pulley are respectively 3.5, 5 and 6.5 in. in diameter, we add the diameter of the largest step drive to the diameter of the smallest cone step, thus,

$$28.5 + 3.5 = 32 \text{ in.},$$

which equals the sum of the diameters of either of the other pairs of steps.

Then to obtain the diameter of the middle drive step it is only necessary to subtract the diameter of the middle cone step from the sum of the diameters as shown, thus,

$$32 - 5 = 27 \text{ in.}$$

The third step is found in the same manner to be 25.5 in. in diameter.

If it is desired to use an open or uncrossed belt then the mode of finding the size of the steps will be somewhat more difficult. This is due to the fact that in this case the distance along the belt line varies according as the size of the steps vary, so that the tension will be greater in some portions than in others. This is probably where the correspondent in question failed. The defect in an open belt is overcome by laying out the cone pulley as shown in Fig. 2.

On A B representing the axis of the cone, lay off the radii of the end steps as shown. "Subtract twice the distance between the centers of the two cones from the total length of the belt (measured over the end steps) and divide the remainder by 6.2832. The quotient is the radius of the curve required." To locate the radius of the middle step or steps: Set off this radius to scale on the dividers, and with one leg set at C and again at D strike the arcs intersecting at E. From the point E and with the same radius strike an arc D C, which will be the curve required. Its intersection with the dotted line or center line of the middle step will mark the face of that step, which being scaled will give the radius.

From E. E. Peasley, Architect, Gloversville, N. Y.—In reply to the inquiry of "J. P. A.," Camden, N. J., in the October issue of the paper, I would say that it is necessary to explain the rule to obtain the length of any belt when the diameter of the large and small pulleys as well as the distance from the center of one shaft to the other is known.

The rule is: To half of the circumference of the large pulley plus half of the circumference of the small pulley add twice the distance from the center of one shaft to the center of the other, and the result will be the length of the belt required.

For an example, we will suppose the large pulley to be 20 in. in diameter, and the smaller one 10 in. in diameter, with the distance from one shaft to the center of the other 120 in. What would be the length of the belt?

Now, if it was desired to change the diameter of the larger pulley to 24 in. and use the same length belt, what would be the diameter of the small pulley?

The solution would be as follows:

20 in. × 3.1416 ÷ 2 = 31.416, which is half the circumference of the large pulley.

10 in. × 3.1416 ÷ 2 = 15.708, which is half of the circumference of the small pulley.

120 in. × 2 = twice the distance from center to center of shafts.

31.416 + 15.708 = 47.124, which is the length of the belt the pulley takes up.

120 × 2 = 240, which is the length of the belt from center to center of shafts.

47.124 + 240 = 287.124 in., the length of belt required.

Now, to change the diameter of the large pulley to 24 in., we proceed as follows:

24 × 3.1416 ÷ 2 = 37.699, which is half the circumference of the large pulley.

47.124 — 37.699 = 9.425, which is half the circumference of the small pulley.

9.425 × 2 = 18.850, the circumference of the small pulley.

18.850 ÷ 3.1416 = 6 in., the diameter of small pulley required for the same length of belt.

Now for the example, take the large pulley, 24 in. in diameter, and the small one, 6 in. in diameter, and the distance the same, 120 in.

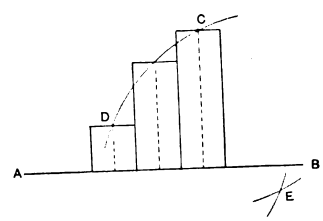


Fig. 2.—Finding the Size of Cone Steps for an Open or Uncrossed Belt.

24 in. × 3.1416 ÷ 2 = 37.699.

6 in. × 3.1416 ÷ 2 = 9.424.

37.699 + 9.424 + 240 = 287.123 in., which is the length of the belt.

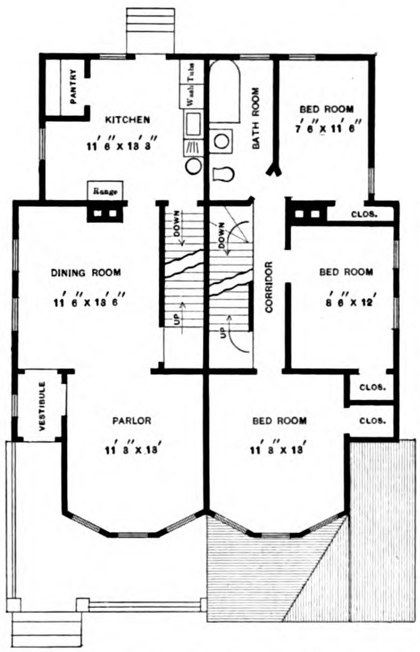
Does Sheathing Aid Destruction of Roof?

From G. W. D., Wakefield, R. I.—I would be glad to have the experienced roofers who read the columns of *Carpentry and Building* explain why a roof laid under the following conditions should rust out in a short time: The roof is quite flat and was laid over an old tin roof, rosin paper being placed between the old roof and the new. A good brand of 14 x 20 tin was used, well nailed and soldered. The roof has only been in service five years, has been kept painted and in good condition on the top. The entire roof is rusted through from the under side.

Note.—This is a matter in connection with which the information gained in experience is of great value to the roofer as well as to the architect and builder, and we hope our readers will freely express their views on the subject indicated above.

Plans for Double House.

From H. A. L., Newark, N. J.—For the benefit of "H. G. D.," Freeland, Pa., whose inquiry appeared on page 366 of the November issue, I am sending a sketch showing a very good arrangement of rooms for a house of this nature. An inspection of the plan will show that the arrangement avoids an expensive stair rail and balustrade, as I make use of what is known as a boxed



Plans for a Double House.—First and Second Floors.

stairway. As the correspondent is able to provide elevations he will also be competent to make any slight changes which may be desired. The size of the house is 28 x 40 ft. Bedrooms on the third floor may be provided if required and a heater may be placed in the basement for heating the house.

Cellar Damp and Smells Musty.

From W. L. C., Stephentown, N. Y.—I hope your readers will give me some help on the trouble I am having with my cellar. My house stands on good hard ground, has a cellar under it with a good drain and cement floor, and with three four-lighted horizontal windows in it, also outside cellar door. No water ever stands in it and very seldom any runs into it. Nevertheless, it is nearly always damp and smells musty and makes the rooms above damp and musty when closed for any length of time. Can some reader inform me of any system or method of ventilation by which I could remedy the trouble?

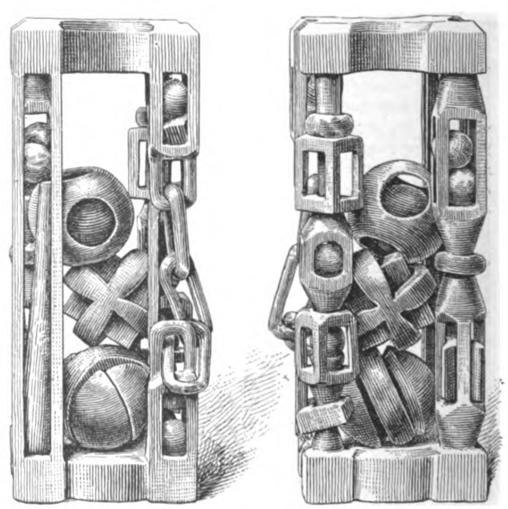
An Example of Ingenious Whittling.

From J. C. Griesel, Pottsville, Pa.—I am sending two photographs showing what it has been possible to accomplish by means of a pocket knife and a block of wood. I send the pictures and the following particulars in the hope that they may be of interest to those who derive benefit from reading articles on pattern making and cabinet making. I suppose there are hundreds of such pieces throughout the country, but I am not familiar with them and neither have I seen in any of my travels anything which excels the piece of work here referred to. It is partly for the reason of bringing out letters from others who have done similar work that I send this communication.

The block in connection with which the work was done is of white pine and measures 1¾ in. in cross section by 4½ in. in length. Out of this block I cut 25 loose and unremovable pieces, such as a ball within a ball, a square within two circles, two halves of a ball held together by a ring, a three-link chain, a bat and ball, two balls in a box, a ring on a spool, a sliding X-shaped block between four guides, a ring and square on a column with a ball in a case in the center. This column ends with a loose ball encased in a square which swivels on a spool surrounded by a loose square block. It is very difficult to describe this block in a way to render all the fine points readily understood. In fact, it should be seen in order to fully appreciate how the pieces are whittled loose and still are unremovable, as some readers may think the different parts were cut to shape and then glued together. Regarding this point I would say that there was no glue whatever used in the construction of this block of ingenius whittling.

I should judge it would take about two months or eight weeks working 8 h. a day to make the block. I remember on one occasion I sat whittling on the block from 7 till 11 p.m., and when I was through I could have placed all the chips which I had made in a thimble. The work is not so much genius nature as it is patience nature, for one slip of the knife would mean total destruction, and very probably it might happen at a very critical part of the block, of which there were many.

In the 15 years that I have had this block it has passed through a number of hands and has been examined by hundreds of people, all claiming that they had never seen anything like it. It has also been on exhibition on several occasions. In the last few years I received some very flattering offers for it from individuals and curiosity seekers, but the readers may judge what it may be worth to me if after 15 years I failed to find any similar example cut out of a solid block anywhere near as small as mine. The two pictures which I send show two opposite views, thus giving a very fair



An Example of Ingenious Whittling.

idea of the appearance of the finished work. I shall be very glad to hear from any others who have attempted work of this nature a d accomplished results which would be interesting to mention in these columns.

Detailed Estimate of Cost.

From B. F. K., Stanstead, Canada.—I have from time to time read with much interest the announcements touching various competitions in back volumes of *Carpentry and Building*, but I have yet to see what I consider an estimate of cost in detail. I should like very much to have some of the practical readers furnish a *really* itemized bill to show the hours of labor, the quantity of materials, sizes, &c.

Why do builders reckon excavating and plastering by the yard and not by the foot, and stonework by the cord or perch instead of by the foot? Why does one say one-third, one-quarter or three-quarters pitch in connection with a roof? I have to frame all buildings "so many inches rise per foot run," and why not say "roof framed 4 in., 6 in., 8 in. or 18 in. to the foot?"

I think the rise and run will always give the correct bevel and lengths. Say we have a building 24 by 28 ft. with 8 in. pitch. Take 8 in. on the tongue and 12 in. on the blade; step the square along 12 times; or if 16 and 24 in. on the square then step off six times, and we get the length of the common rafter and the bevels; 8 in. on the tongue and 17 in. on the blade stepped off 12 times gives the hips and bevels. For jacks placed 16 in. apart keep the tongue on the plumb line and shove the square to the 16-in. mark. I think this will take off the right amout to bevel the hip, then pick up the piece taken out for the notch, place it on the corner of the square as the hip would set, and scribe off the projecting corners. The side bevel is simply the rise and run, or the length of the common rafter and distance from the corner.

Note.—The various comments of the correspondent above afford a good field for interesting discussion, and we shall be glad to have our practical readers express their views fully and freely on any or all of the points touched.

With regard to a detailed estimate of cost in connection with competitions which have been conducted under the auspices of this journal we present herewith an example of one accompanying a set of drawings received some time ago and which may be regarded as typical for purposes of illustration. While relating to a building costing something over $7000, it will, we think, closely approximate the requirements of the correspondent making the inquiry above:

Estimate of Cost.

EXCAVATION: 285 cu. yd., at 45 cents		$128.25
STONEWORK: 166 perch, at $2.25		373.50
BRICKWORK: Rear chimney, 43 lin. ft., at $1.35	$58.05	
Front chimney, 17 lin. ft., at $1.35	22.95	
9 lin. ft., at $1.50	13.50	
9 lin. ft., at $2	18.00	
9 lin. ft., at $2.10	18.90	
Two brick piers, at $4.90	9.80	
		141.20
CUT STONE: 31½ ft. of sill, at 90 cents		28.35
CARPENTER WORK: One man at $3.60 per day, 112 days	$403.20	
Two men at $3.20 per day, 112 days	716.80	
		1,120.00
PLASTERING: 986 sq. yd., at 27 cents		266.22
STUCCO: 423 sq. yd., at $1		423.00
PORCH FLOOR: 175 sq. ft. concrete, at 14 cents		24.50
CELLAR FLOOR: 105 sq. yd., at 50 cents		52.50
CONCRETE STEPS: 51 lin. ft., at 50 cents		25.50
HEATING: 747 sq. ft. of radiation, at 90 cents		672.30

Lumber.

4 pcs. 2 x 12, 28 ft. long, at $30	$7.32	
4 pcs. 2 x 12, 16 ft. long, at $20.50	2.56	
46 pcs. 2 x 10, 28 ft. long, at $29.00	62.23	
34 pcs. 2 x 10, 18 ft. long, at $21	21.42	
31 pcs. 2 x 8, 28 ft. long, at $28	32.40	
8 pcs. 2 x 8, 16 ft. long, at $18.50	3.14	
80 pcs. 2 x 6, 20 ft. long, at $22	35.20	
10 pcs. 2 x 6, 12 ft. long, at $19	2.28	
180 pcs. 2 x 4, 10 ft. long, at $18	21.60	
110 pcs. 2 x 4, 20 ft. long, at $22	32.23	
20 pcs. 2 x 4, 18 ft. long, at $22	5.28	
90 pcs. 2 x 4, 16 ft. long, at $19.50	9.60	
10 pcs. 2 x 4, 28 ft. long, at $28	5.20	
7 pcs. 4 x 4, 18 ft. long, at $24	4.32	
450 lin. ft. 1 x 3 bridging, at $17.50	1.96	
5500 bd. ft. 1 x 10 sheathing, at $17.50	96.25	
2000 bd. ft. 1 x 6 sheathing, at $17.50	35.00	
1650 bd. ft. ⅝-in. Y. P. ceiling, at $20	33.00	
2300 bd. ft. ⅞-in. Y. P. flooring, at $39.50	88.85	
1200 bd. ft. ⅞-in. oak flooring, at $49	58.80	
170 bd. ft. maple flooring, at $44	7.48	
20,000 XXX shingles, at $4	80,00	
2500 lin. ft. ⅝ x 1¾ fur., at 50 cents	12.50	
1000 bd. ft. ⅞-in. cypress, at $45	45.00	
2000 lin. ft. lattice, at 40 cents	8.00	
10 rolls deadening felt, at 90 cents	9.00	
		720.62

Millwork.

27 Korelock doors, 6-panel, at $2.45	$66.15	
2 white pine doors, at $2	4.00	
3 white pine sash doors, at $3.60	10.80	
2 special doors, at $8	16.00	
900 ft. yellow pine base, at $4	36.00	
1000 ft. shoe, at 40 cents	4.00	
150 ft. 3-in. chair rail, at $2	3.00	
300 ft. quarter round, at $1	3.00	
2 lattice doors, at $4.50	9.00	
840 ft. picture mold, at $1	8.40	
32 double hung windows, with all trim, casings, frames, &c., at $5.45	174.40	
8 basement windows and trim, at $1.75	14.00	
Pantry cases	60.00	
Main stair	100.00	
Attic stair	75.00	
2 collonades, at $30	60.00	
Trim for 34 doors, average per $2.25	76.50	
2 casement windows, pair $4.50	9.00	
		729.25

Mantels.

2 mantels, at $45		90.00

Light Fixtures.

Gas and electric fixtures		100.00

Metal Work.

100 ft. guttering, at 30 cents	$30.00	
20 ft. hanging gutter, at 15 cents	3.00	
13 ft. down spout, at 10 cents	1.30	
40 ft. down spout, at 15 cents	6.00	
20 ft. down spout, at 10 cents	2.00	
74½ sq. ft. tinning, at 10 cents	7.45	
136 ft. flashing, at 4 cents	5.44	
Labor included.		55.19

Plumbing.

50 ft. ¾-in. iron pipe, at 8 cents	$4.00	
250 ft. ½-in. iron pipe, at 7 cents	17.50	
56 ft. 6-in. tile pipe, at 9 cents	5.04	
70 ft. 3-in. iron pipe, at 18 cents	12.50	
50 ft. 2-in. iron pipe, at 16 cents	8.00	
350 lb. lead pipe, at 10 cents	35.00	
Fittings	25.00	
Solder	3.00	
Two men 10 days, at $5.60	112.00	
One laborer two days, at $2	4.00	
Two baths, at $32.25	64.50	
Two closets, at $26.50	53.00	
Two lavatories, at $33	66.00	
Double tub, at $47.50	47.50	
Two sinks, at $24.50	49.00	
		506.14
GAS FITTING: 385 ft., at 12 cents		46.20

Painting.

INTERIOR: 508 sq. yd., at 20 cents	$101.60	
80 sq. yd., at 15 cents	12.00	
40 sq. yd., at 30 cents	12.00	
20 sq. yd., at 35 cents	7.00	
23 sq. yd., at 50 cents	11,50	
EXTERIOR: 360 sq. yd., at 20 cents	72.00	
20,000 shingles, at $2.70	54.00	
		270.10

Rough Hardware.

1 coal door and frame	$2.00	
6 clean-out doors, at $1.25	7.50	
5 thimbles, at 10 cents	.50	
400 lb. 8d nails, at $1.75	7.00	
300 lb. 6d nails, at $1.75	5.25	
300 lb. 10d nails, at $1.75	5.25	
50 lb. 4d nails, at $2	1.00	
100 lb. 3d cut nails, at $2.50	2.50	
100 lb. 6d cut nails, at $3	3.00	
50 lb. 8d finish nails, at $2.50	1.25	
50 lb. 6d finish nails, at $2.50	1.25	
		36.50

Electric Wiring.

2000 ft. No. 14 rubber covered wire	$30.00	
250 ft. No. 12 rubber covered wire	5.00	
75 ft. No. 10 rubber covered wire	1.50	
1 snap switch	.20	
10 push switches	7.50	
4 three-way switches	3.60	
14 1-gang renims	2.80	
350 base receptacles	1.40	
350 3-in. tubes	1.40	
50 4-in. tubes	.25	
1 D. P. main block	.20	
8 D. P. branches	1.20	
2 25-amp. kn. sw	1.50	
1 35-amp. kn. sw	1.00	
125 ¼-in. loom	6.25	
50 ½-in. conduit	5.00	
6 conduit boxes	.90	
2 condulets	1.50	
2 4-circuit cabinets	8.60	
6 key sockets	11.20	
6 rosettes	.60	
18 10-ampere plugs	.90	
2 yd. asbestos	.25	
4 lb. bell wire	2.00	
25 ft. lamp cord	.75	
2 buzzers	.50	
2 3-in. bells	.50	
2 metal pushes	.40	
2 floor pushes	.40	
3 dry batteries	.75	
Labor	35.00	
		123.05

Sodding.

Lot 50 x 130, 585 yd., at 10 cents		58.50

Shades.

40 shades, at 75 cents		30.00

Sidewalk.

232 sq. ft., at 14 cents		32.48
SCREENS		70.00
DECORATION		200.00
ORNAMENTAL HARDWARE		90.00

Recapitulation.

Excavation	$128.25
Stonework	373.50
Brickwork	141.20
Cut stone	28.35
Carpenter work	1,120.00
Plastering	266.22
Stucco	423.00
Porch floor	24.50
Cellar floor	52.50
Concrete steps	25.50
Heating	672.30
Lumber	720.62
Millwork	729.25
Mantels	90.00
Light fixtures	100.00
Sheet metal work	55.19
Plumbing	506.14
Gas fitting	46.20
Painting	270.10
Rough hardware	36.50
Electric wiring	123.05
Sodding	58.50
Shades	30.00
Ornamental hardware	90.00
Decoration	200.00
Screens	70.00
Sidewalk	32.48
Total	$6,413.25
Contractor's 10 per cent	641.32
	$7,054.57

Operation of Domestic Septic Tanks.

A paper on domestic septic tanks read at the last meeting of the American Society of Inspectors of Plumbing and Sanitary Engineers provoked an interesting discussion covering in part matters of detail in the operation of this method of sewage disposal. The paper mentioned was presented by Herbert F. Shade, plumbing inspector of Victoria, B. C., and was printed in our issue for May, 1908. The leading points of interest are brought out in the following:

BURTON J. ASHLEY, Chicago: In the case of a domestic septic tank there is no necessity for baffle walls. The scum or the mat which forms on top should not be disturbed at least until it gets to an abnormal thickness. That abnormal thickness is oftentimes occasioned, as I have found from experience, by the accumulation of excrementitious matter being lighter than the water or lighter than the fluid, and being unable to descend where the greatest amount of action takes place. Consequently, if at the end of six months, or such a matter, the mat is entirely destroyed or disintegrated, which releases the gases that are contained therein, the material becomes of a greater specific gravity than the contents of the tank, and it will fall to the bottom. I have never seen fully the necessity of the baffle wall, which I know some engineers have advocated. Those who have followed the experiments at Columbus, Ohio, remember that no mats whatever formed on the tops of the experimental tank which was in operation in Columbus something over a year. I do not recall the size of the tank, but it must have been some 30 or 40 ft. long, and I do not recall its width. Why the mat does not form, I think, has not been ascertained as yet, at least I have not discovered any one who has offered a solution. Then these baffle walls are of no consequence.

Size of Inlet to Tank.

It is quite clear that you must not submerge your inlet too deeply or you will have clogging in your inlet pipe. In most of the inlets there is too great a cross-sectional area. For instance, take the ordinary 4-in. soil pipe in a domestic septic tank, with the ordinary flush of the water of a bathroom or water closet; that is sufficient to carry the excrementitious matter and the solid matter from the sinks down underneath if the inlet is not submerged more than perhaps 12 in.

I have had a case occur recently in which there was a certain tank that was being constructed for ordinary domestic use with a larger size inlet, contrary to the plans and specifications, and I question whether the tank will continue to be used without possibly clogging at this point, in consequence of the enlargement of the inlet, because there will not be enough flushing from the household at any one time to carry the solid matter down beneath the surface.

The Subsoil Drains for the Effluent.

The distribution of subsoil drains, such as the Waring system of subsurface irrigation, will work admirably if it is flushed sufficiently with a siphonic flush from the septic tanks; but my experience has been that where a system of radiating pipes has been used in connection with the ordinary flow from septic tanks there has never been any system of pipes of the description installed, in which each one of the radiating pipes would take its share of the flow or overflow from the septic tanks. Some one pipe was stealing it all and the other pipes were not distributing properly in consequence: some one of the lines would become overtaxed and would finally fail.

Not more than four weeks ago I had the privilege of examining at the home of Colonel Elkins, just outside of Philadelphia, one of these subsoil irrigation plants which has been in operation perhaps some 10 or 15 years. It seemed to be doing very nicely, but over in the field where these systems of radiating pipes were placed I found that two pipes apparently had been doing all of the work, and instead of being under the soil it was practically up at the top of the soil and amounted to surface irrigation. There was no siphonic action at all; it simply flowed away as fast as the sewage was produced.

It was stated a year ago by one of the members of this association at the Cleveland meeting that many of those old systems in the East have failed there on account of this want of proper distribution, also because those pipes were placed too near to the surface of the soil. I wish to refer briefly to the potency of air as a purifying agent. There has never been enough attention paid to the aerating of these subsoil drains. With proper aeration purification takes place and the water or the septicized fluid, rather, then becomes what you term pure water. It should be odorless; it should be colorless and practically harmless. Fish would live in it. It does not take more than 24 to 48 hr. to work this remarkable change, and it is only a discredit, it seems to me, upon the engineering profession that we have not long before discovered the power of nature, those purifying agents which we are now beginning to understand a little bit in purifying the foulest of all germs, and that is what humanity produces.

There has been a recent investigation made, I believe, by Dr. Reed, who is president of the Royal Institute of Sanitary Engineers of Great Britain, with reference to the matter of filter beds. Filter beds have been constructed of all depths, anywhere from 2 to 12 ft. Dr. Reed some time early last year made some 18 or 20 experiments with reference to the potency of filters, and to see the thickness to which filter beds should be built. The result of his experiment was that nearly all the work is done in the first foot, or first depth of the filter, and I think the tendency hereafter will be to lessen the depth of the filter beds in order to produce this physical purification in the disposition of sewage.

Purification of Manufacturing Wastes.

O. B. CRAIG, Pittsburgh: What is the result with the septic system where there is large proportion of chemical discharge? I understand that the chemical discharge, such as acids and alkalies that we get from tanneries and chemical works, are against the action which has been described here. The bacteria do not thrive; they do not do their work where chemicals are present. I would like to hear something on that subject.

MR. FRANCIS: There have been a great many experiments going on with reference to the discharges of manufactories, and it is a problem that has not been solved yet. The septic tank does not commend itself to manufacturers, but they will undoubtedly get some method that will reduce the waste of manufactories to a harmless substance. In the first place, there is not a fourth as much harm or danger in it as people think. It is a very different sort of thing in comparison with domestic sewage, which is really a specific poison. That is what the gentlemen here of this organization should have in mind, that they are dealing with a specific poison, more dangerous than any I know of on earth. The introduction of domestic sewage into the stomach or digestive tract is always attended with terrible consequences. We know that a great epidemic of typhoid was produced in a little town in Pennsylvania by two cases of typhoid fever. The discharges of those patients was suffered to get into the water supply of that town, and they had 1800 cases of typhoid fever in three weeks, and something like 280 deaths.

MR. ASHLEY: Answering Mr. Craig, there is no question regarding septicization of sewage which is impregnated with chemicals. There has been some investigation made, and I think the general conclusion is that the chemicals only for a time delay decomposition; that in time it will spring up and septicization will begin later on after the chemical effect has been passed over. I know that with the different chemicals that are used in reservoirs for the purification of water, there is precipitated a sort of a mass to the bottom of the water in consequence of the introduction of the chemicals, and if that mass is not taken up soon it begins to decompose in the water, so that chemicals are not a complete solution of the matter of getting rid of certain kinds of matter. It will finally come up and be septicized in spite of the chemicals later on.

TIMELY SUGGESTIONS FOR THE PROGRESSIVE CARPENTER.*

BY J. CROW TAYLOR.

ONE of the things the progressive carpenter is called upon to study and do something in a practical way with it is veneering. Sometimes he only has to handle it—that is, fit together mill work which consists of veneer panels and the framing that goes with it; at other times, however, he may be called on to do a little special job now and then in veneering. In either case it is rather important he should know something about the business and have not only a speaking acquaintance with it in different forms, but a working knowledge of it, so that when occasion requires he can do some veneering himself.

In its earliest stages veneering in this country was confined almost exclusively to the use of thin sheets of mahogany and other fine woods for covering the body of some plain wood to get the desired face without going to the expense of having the entire piece out of solid wood. In the later development, however, veneering while still embodying as a factor this point of getting the best face on the outside has developed special qualities of usefulness that overshadow the original cause for its use. It is the only way to get certain large panels, and it enables one to get greater strength of wood and greater stiffness with less weight. There are lots of things done in mill work now by the aid of veneer panels that would hardly have been possible if the art of veneering had not been developed. The writer has seen built-up panels faced with mahogany as large as 6 x 16 ft. in connection with store or show window work. There have been numerous curves and corners made with veneer work, built-up, that it would have been next to impossible to make out of solid wood without showing so many joints and different figures on the face that it would have spoiled the work.

Different Kinds of Veneer.

One of the first questions to study in connection with veneer is the different kinds and their advantages for certain purposes. The Forest Service makes only two general classes of veneer, that is classes divided by the method of manufacture. One is termed "rotary cut," in which a section of a log is swung between the centers and is rotated by heavy spindles and chucks, while a knife peels the veneer from the outer surface in long sheets. The other method is termed "sawed" or "sliced veneer," in which the majority of the stock is quartered or cut right the reverse way of the block from what it is in making rotary cut stock. There is some sliced veneer that is practically the same as plain cut, but the majority of it as well as the majority of the sawed veneer is cut on the rotater because it is essential to work the stock this way to get the quartered cutting.

The veneer user, however, should distinguish between sliced veneer and quarter sawed veneer, though both may be and frequently are used for the same purposes. In the case of quartered oak veneer there is a difference as well as a distinction between the sawed and the sliced. The sliced veneer is smoothest when it comes from the machine, for the sawed stock, even with the best of saws, has some saw marks on it, and is a little more difficult to finish off. But the sawed veneer has two advantages; one is the wood is firmer, the grain not having been disturbed by cutting, and the other is it has two faces, while sliced stock has only one. It is easy to see, therefore, that for certain kinds of work it is practically imperative to have quarter sawed veneer instead of sliced.

It may be added in this connection that sliced cut quartered oak veneer is much more extensively used now than it once was, and the sawed stock is, too, for that matter. But a long acquaintance with and a better understanding of handling veneer have taught the users that properly cut sliced veneer will do for lots of work that formerly nothing but sawed stock would answer. Quite frequently they have dispensed with some of the crotch matching and now use sliced stock with the same face out all the time, and match the figures so as to run continuous in one direction, so that the joints are hardly discernable rather than make the joint prominent by crotch matching.

Examples of this are frequently found in mantel columns of late patterns. If one is in doubt and not a good judge of the quality of sliced veneer it goes without saying that the safest plan is to use sawed stock, for in this if the figure is all right to begin with you know that the wood has not been split in cutting, whereas if you are not a good judge you might get hold of some sliced stock that after finishing would grain up and look bad.

Rotary cut veneer might properly be divided into three classes: poorly cut, fairly well cut and well cut. And there are about as many different kinds of it as there are different kinds of wood used in the veneer business, and that is practically every kind that grows to workable size. The main species so far as wood is concerned that carpenters are likely to have to do with are oak, birch, gum, poplar, basswood and maple. Mahogany and walnut are sometimes rotary cut, but more often sliced or sawed. Gum, poplar, basswood, chestnut, birch and some other woods are used considerably for fillers, and oak, maple, gum and birch are used for face woods along with mahogany, walnut and other woods prized for their figure. On all of these there is what is termed the "face" and the "back," and that part of the veneer which is outside in the process of cutting should be termed "outside" when used, with one known exception. That is bird's eye maple, which is used with the inside out because the bird's eyes in maple gradually diminish in size toward the center of the log, and to guard against the chance of some of these coming out in the course of time through loosening up. The veneer is put on with the outside in because this is the large side of the bird's eye.

One of the most extensively used of the native woods for face work is rotary cut oak. It frequently presents a beautiful figure, too, but not the same figure feature as is found in the quartered oak. It doesn't have the high shining splash line, but it does have the figure made by the annular rings of growth, which alternates in light and dark, in compact and porous streaks that are frequently formed into very beautiful lines that when properly stained and finished present an excellent face. For making large panels the rotary cut stock always furnishes an advantage over the sliced or sawed in that you can get it in larger dimensions so it is not as often necessary to joint.

Rotary Cut vs. Quartered Stock.

There is one point of consideration between rotary cut stock and quartered stock which hasn't yet been presented that needs more than passing attention. Usually the prime object in quartering oak is to get a better figure, but there is yet another point, and that is there are certain occasions where it is necessary to use it regardless of the question of cost, and it is the same thing that causes cabinet makers to use quartered lumber instead of plain lumber when there is no question of figure entering.

It is a question of swelling and shrinking and warping and checking in the face. Lumber or veneer either that has been quartered while it shrinks in time and will afterward respond, more or less, to the influence of moisture is not affected the same as what is termed plain cut stock. In some work where it is imperative to have it retain its shape and remain free from face checks, it is necessary to use quartered stock even when the work is built-up with veneer. There is probably not a great deal of this in connection with house trim, but for panels that are to be highly decorated or rather so finely finished and artistically done that just a little checking in the face afterward would mar the beauty, the material to use is quartered stock no matter if it is oak, gum, poplar or white holly.

The point is mentioned here more for the sake of impressing it on the mind for special occasions than for general use, for in the general run of work that the carpenter is called on to do there is usually not much need to distinguish between rotary cut and quarter cut veneer except that it is a matter of figure.

* Continued from page 387, December, 1908, issue.

ORNAMENTAL WORK IN SHEET COPPER.

Great encouragement has been given to the sheet metal worker by architects for high class buildings in providing for the use of sheet metal for the ornamental features. In copper a metal is found that not only lends itself naturally to the artistic demands, but also to the practical necessities of the artisan. In our seaboard climate as well as in the interior copper has shown a durability which leaves little to be desired in comparison with stone, and even at the present prices offers substantial cost inducements over stone. When exposure to the weather has contributed the bronze effect, dignity is lent to any building which may be constructed with a copper cornice or other architectural or purely ornamental features. Now that the architect is given a freer hand in his designs for the embellishment of business buildings it is not strange that his recommendations for the adornment of fine residences with copper decorations are accepted, and the homes of some of our citizens give pleasure from their appearance to all who may chance to see them. It is the work in copper for one of these handsome houses that will lift up the sheet metal workers who are engaged in the more intensely practical work of their trade, and we are glad to bring it to their attention.

In the accompanying illustrations are shown drawings of the ornamental finial work in sheet copper placed on the residence of Charles M. Schwab, on Riverside Drive, Seventy-third and Seventy-fourth streets and West End avenue, New York City. In Fig. 1 is reproduced an elevation of the cresting and finials on the chapel roof of his house, and in Fig. 2 is shown the elevations of a finial on the roof of the main part of the house. The building has a steel structure forming a part of its fireproof construction, and the erection of the sheet copper work presented some special problems on that account. The detailed sketches will serve to indicate how this work was accomplished.

The roofs are in general covered with tile, with gutter linings of 20-oz. cold rolled copper, and capped with finials which are also of 20-oz. cold rolled copper. The side view of the finial on the chapel roof shows also the position of the tower which adorns that part of the building. The ornamental work shown is pressed, the plain circular work was spun, while the straight work was formed on the brake and hammered by hand. The elevation of the finial on the roof of the main building, shown in Fig. 2, indicates the I-beam that forms the ridge of the roof. Terra cotta blocks were placed in the roof channels and on top of these was laid the tile. The finial was erected on this work, with iron rod supports, furnished by the iron construction. At A is shown the section of the apron of copper which covers the ridge of the roof.

In Fig. 3 at B is shown a section of this apron, indicating how it is joined to the stone coping of the parapet wall of the deck roof which covers this part of the building. It will be noted that a raglet is cut into the coping at C, and into this the apron is set, calked with molten lead. Facing the flat deck roof a flashing E is provided, this flashing under the tile roof D and into the enamel brick wall G at F. The flashing was built in as the work progressed to avoid splitting the enamel brickwork, as would occur if the joint had to be cut for the flashing. Where so much care is taken to produce a fireproof and time defying structure it is a source of pride to the old time tinsmith to note the advances which have been made in the branch of industry of which at one time he was the sole representative. It is very evident that the copper ornamentation of fine buildings is destined to find a greater demand in the future and that the construction will bring occupation and pride to a high class of workmen.

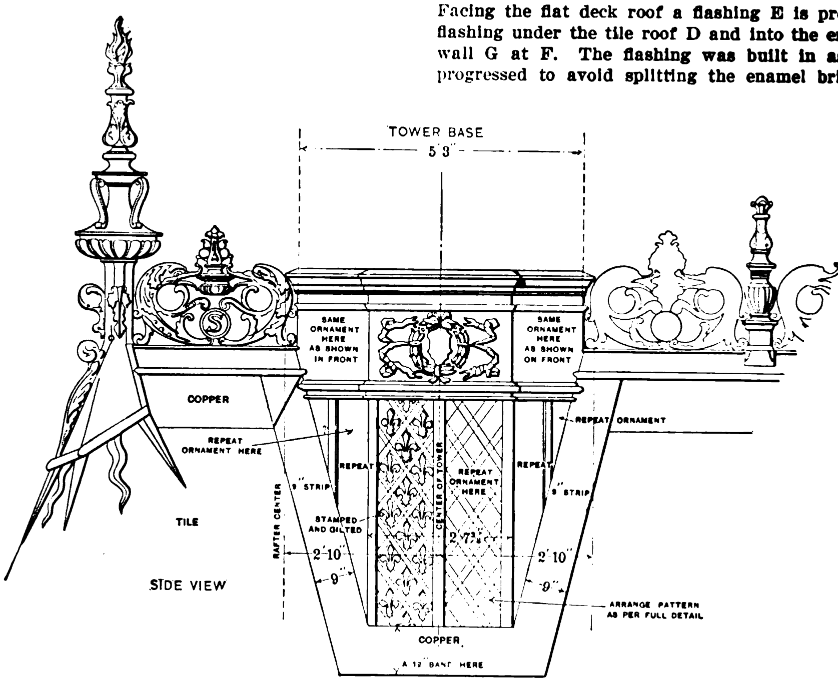


Fig 1.—Side Elevation of Cresting and Finials.

Ornamental Work in Sheet Copper.

Paint for Porch Floors.

More or less difference of opinion exists as regard to what is the best composition for a porch floor paint, and difficulty is often encountered as to what should be done under certain stated conditions. In one situation, where a porch faces the south with a portion of it also extending around the west side of a dwelling, the owner has used ready mixed oil paint, but with the result that it soon blistered. He then had the paint scraped off and painted the floor with a well-known floor paint which comes ready for use. This did not blister, but within two months it came off in flakes. The floor is yellow pine, and the owner wants to paint it again, stating that in its

immediate vicinity the ground is somewhat damp and the ventilation underneath the porch is rather poor. After stating his case to *The Painters' Magazine*, the following reply was published in a recent issue:

We would advise you to provide proper ventilation, if possible, under the porch floor, because we think the original blistering was due to the dampness under the floor. That the second painting flaked was not unlikely due to inferior varnish in the paint and an insufficiency of oil to bind it. Before applying more paint the floor should be well cleansed and permitted to dry thoroughly. Then a thin coat of pure lead in oil, tinted to nearly match the finish desired, and thinned two parts raw linseed oil to one part turpentine and a very little drier should be applied and well rubbed into the wood. Allowing this to become hard two coats of a high grade exterior floor paint should be given, each coat carefully brushed out, or a first-class ready mixed house paint that is somewhat reduced with turpentine could be used in place of floor paint.

If you prefer to mix your own paint we would suggest that you mix white lead and zinc in equal portions, tint to color desired and reduce for application with six parts raw linseed oil, three parts turpentine and one part drying japan. This will do for both second and third coats, but for the latter coat the addition of a small portion of hard drying varnish would be an improvement.

Photography in the Measuring of Buildings.

Architectural students frequently require measurements of buildings, and in the case of the larger structures these are often by no means easy to obtain. By selecting a time when the front of one of the buildings is covered with scaffolding, this measuring does not present insuperable difficulties, though assistance with the measuring tape is usually necessary. If no such scaffolding is available the work must be done by means of ladders, and often at considerable bodily risk, though the method of lowering a rope marked distinctly in 3-ft. lengths may sometimes be useful, distances being set off on a rough sketch elevation by a colleague situated on the ground and at some little distance. Some recent experiments have shown that considerable use may be made of photography in this direction, provided a few special points are attended to, says a recent issue of the *British Journal of Photography*. First, a viewpoint should be chosen as nearly as possible opposite the center of the frontage, and in every case the axis of the lens must be absolutely at right angles to the frontage. On some part of the building a scale must be made by marking chalk lines at a distance of, say, 3 ft. apart. If it is undesirable to mark the building in this way four or five white rods or laths may be set on the pavement in a vertical position and placed a yard apart. Measurements on the one plane only can be made, though if there are two parallel planes the one photograph may be utilized for measurements on both planes, provided a scale is attached to each plane. The depth of a recess or the extent of a projection cannot be measured from the "photograph."

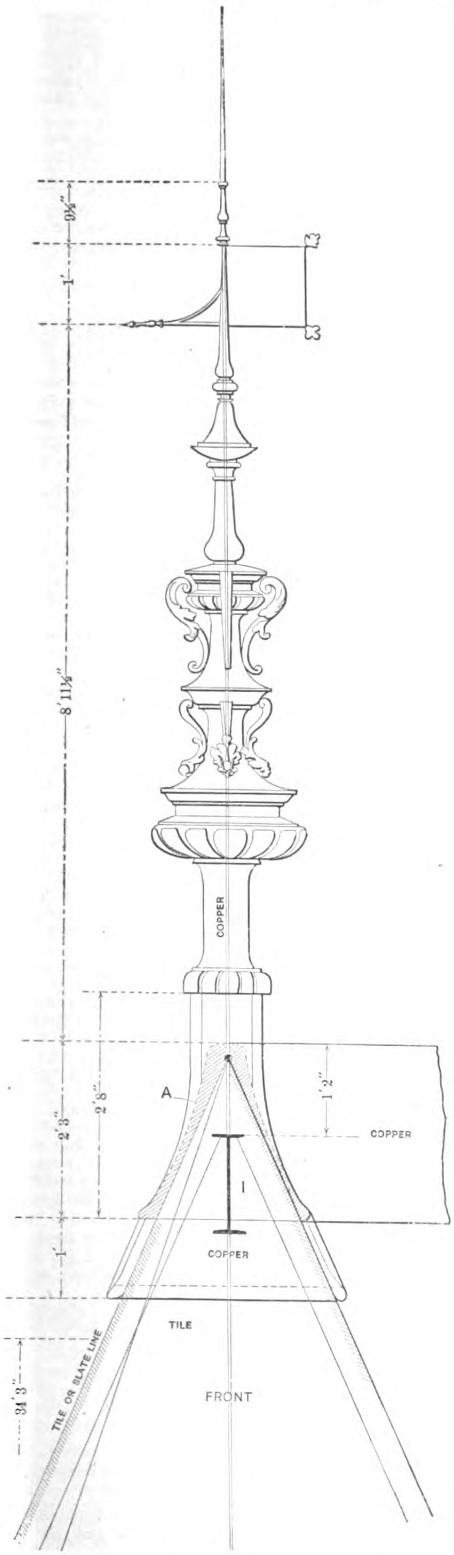


Fig. 2.—Elevation of Main Finial.

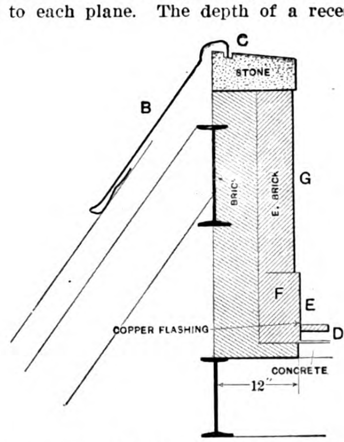


Fig. 3.—Method of Making Water Tight Connection.

Ornamental Work in Sheet Copper.

WHAT BUILDERS ARE DOING.

REPORTS from leading cities of the country for the month of November indicate a much greater increase in building activity as compared with the same month in 1907 than was generally expected. A surprising feature is the tremendous gains in the value of the new work for which permits have been issued in some of the leading cities of the country, more especially New York, Chicago, Philadelphia, Cincinnati, Brooklyn, Baltimore and Denver. It is doubtful if ever before, or, at least, in recent years, was the increase in building operations over the corresponding month of the year before so great as it was in November last. The figures available testify in a most striking manner to the gradual revival of confidence in the business situation, and the feeling is quite general that the coming spring will see mechanics in all branches of the building industry busily engaged.

Baltimore, Md.

There was an appreciable improvement in building operations in November as compared with October, this being a reversal of the usual order of things, as the approach of cold weather generally causes a slowing up of operations. In November $342,550 were expended in the erection of dwellings, warehouses, factories, &c., while in October the amount involved was $254,000. In November $8465 were expended in alterations and additions. Of the permits issued in November, 62 were for two-story brick dwellings, costing $83,000, and 11 were for three-story brick dwellings costing $95,000. There were also permits for 16 two-story frame dwellings costing $49,550. There were four factories and warehouses, projected to cost $65,000, and three moving picture theaters to cost $17,000.

For the 11 months of the year improvements were projected valued at $5,013,796.90, with additions valued at $302,741, making a total of $5,316,537.90. Adding 20 per cent for undervaluation, which is the custom here in the city, makes the aggregate for the 11 months of the past year $6,379,845.48. During that time 1693 two-story brick buildings were projected, to cost $2,189,800, in addition to these were one four-story and 171 three-story brick dwellings, 96 two-story frame buildings and 10 three-story frame buildings.

Cleveland, Ohio.

Building work is going ahead fairly satisfactorily for this season of the year, and a number of new projects are coming up which make the outlook good for considerable activity early in the spring.

Building permits issued by the inspectors' office in Cleveland during November numbered 503 and aggregated $899,625, as compared with $898,962 during October. This is regarded as a very satisfactory showing, for ordinarily there is considerable falling off during November. During November, 1907, there were 473 permits issued, aggregating $870,318. During November, 1908, there were issued 238 permits for frame buildings, amounting to $450,750; 51 permits for brick and stone buildings, amounting to $386,015, and 214 permits for additions and alterations, amounting to $62,859.

Denver, Colo.

There seems to be no let up to the building activity which has characterized the city for several months past, the bulk of the operations being confined to the construction of private residences. During November, according to the report of Building Inspector Robert Willison, 246 permits were issued for improvements estimated to cost $548,200; while in November, 1907, there were 131 permits issued for improvements estimated to cost $345,355. Of the permits issued in November last 166 were for brick residences costing $402,600 and five were for frame residences costing $4800. There were four apartment buildings projected, estimated to cost $49,000, and four terraces to cost $25,000, as well as 10 business buildings involving an estimated outlay of $21,000.

For the 11 months of 1908 there were 2943 permits issued for improvements estimated to cost $9,068,920, while in the same period in 1907 there were 2403 permits taken out for improvements costing $6,045,764.

Los Angeles, Cal.

In this city frame construction is keeping up well; in fact, this line of work shows a considerable improvement over the same season last year, and has shown little or no drop during the last few weeks on account of the weather. The slump in the construction of business buildings which was noted earlier in the year continues, and not much improvement in this line is anticipated before the opening of next spring. During the whole month of November the volume of brick construction, including alterations to brick buildings, only reached the modest figure of $75,000. Besides the brick buildings, there was one reinforced concrete building to cost $111,000.

During November the total number of permits issued reached a total of 542, with a total estimated valuation of $752,397, as compared with 749 permits, with a valuation of $1,001,999, for the month preceding, and 522 permits for buildings to cost $846,780 in November, 1907.

Architects claim to be fairly busy on plans for work to be started early in 1909. Most of the work now in the hands of the architects, however, is for residences and buildings of the smaller sort. For the first time in years there seems to be an abundance of business buildings to meet all requirements. It seems likely, however, that the present low cost of construction will lead to the construction of a number of church, school, lodge and similar buildings, from the construction of which no revenue is expected.

Memphis, Tenn.

The advent of winter weather has caused a decided falling off in building operations as compared with this season the year before, and the figures for November represent a very appreciable percentage of reduction. In November there were 185 permits issued, calling for an outlay of only $128,943, clearly indicating that the bulk of the improvements were in the nature of comparatively inexpensive buildings. In November, 1907, 133 permits were taken out for work estimated to cost $311,704.

The members of the Builders' Exchange participated in the celebration of the ninth birthday of the organization on Thursday evening, December 3, at the headquarters in the Goodwyn Institute Building. There was a large and enthusiastic audience present, who seemed to enjoy to the fullest extent the attractive programme which had been arranged by the Exchange Glee Club, under the direction of D. M. Crawford, for the occasion. This programme included short addresses on various topics, interspersed with musical selections by soloists and the Glee Club. Secretary O. O. Howard presented a most interesting history of the Memphis Builders' Exchange, and was followed by I. N. Chambers, E. F. Dowling, J. J. Bishop, C. J. Wagner and William K. Burnett. Mr. Wagner spoke on industrial education, a subject which just at the present time is attracting a great deal of attention all over the country.

Minneapolis, Minn.

The building inspector's figures for November show that the number of permits issued was 387, as against 298 for the corresponding month in 1907, and the total cost of all buildings for which permits were issued amounted to $922,995, as compared with $615,315 in November, 1907.

The total number of building permits for the 11 months of 1908 foot up to 5393, while the total number of permits for the entire year of 1907 amounted to only 4791. The cost of the buildings for which permits were taken out during the first 11 months of last year was $9,370,745, as compared with $9,603,095 for the 11 months of 1907.

Fire losses in Minneapolis for the first 11 months of last year figure $1,002,006.42, as compared with $977,155.58 for the entire 12 months of 1907.

The largest center of building in Minneapolis during the ensuing year will be the University of Minnesota campus. A report recently given out by the regents of the university states that work will shortly begin on new buildings on the campus to cost upward of $800,000, the structure to include a men's building, to cost $250,000; a building for the College of Education, to cost $100,000; a dental building, to cost $100,000; a pharmacy building, to cost $100,000, and the building for the College of Engineering, to cost $250,000. In addition to these structures, which are assured, the regents will call on the Legislature at the coming session for $100,000 for an anatomical building and $250,000 for several smaller structures, including a telephone building and an engine room building.

At the regular monthly meeting of the Builders' Exchange, held on December 1, the election of officers for the ensuing year occurred, resulting as follows:

President, S. G. Tuthill.
First Vice-President, James Tyler.
Second Vice-President, William Sargent.
Treasurer, Harry B. Cramer.
Sergeant-at-Arms, H. C. Christensen.

The annual reports of the various officials will be made at the meeting of the exchange to be held in January.

Nashville, Tenn.

The Nashville Builders' Exchange had a housewarming on the evening of Thursday, November 19, at the new quarters of the organization in the Stahlman Building. Addresses were made by prominent members of exchanges in other cities who were present, after which a bounteous collation was served. The principal speech of the evening was by J. B. Bird, manager of the National Association of Manufacturers, who spoke of the organization of his association and the valuable work it was doing. He explained as the object of his visit the desire to encourage the co-operation of the Nashville Builders' Exchange with his organization, expressing the hope that the first official act of the local body would be an application for membership in his association.

Alfred Struck, ex-president of the Louisville Board of Exchange and at present a director of that body, spoke of the value of united organization and deplored the jealousies existing in the building business, which he hoped would be annihilated by the various exchanges throughout the country.

J. E. Putnam of the Atlanta Builders' Exchange referred to the excellent beginning of the Nashville Exchange and the attractive quarters secured by the organization. He urged the necessity of a noon hour meeting with a view to establishing good fellowship among the members, and pointed out methods by which the interests of all would best be served. T. K. Harper of the Memphis Builders' Exchange referred to the organization by his association of an Industrial League for the purpose of furthering industrial education and the support of an idea for the purpose of having an industrial high school. Other addresses were made by Major E. B. Stahlman, George C. Cummins and President H. W. Buttorff of the local exchange.

After the speeches had been made refreshments were served in adjoining rooms.

New York City.

Permits for buildings involving large amounts of capital constitute an interesting feature of the local building situation, and present indications point to quite a revival of building as soon as spring opens. While the total number of permits issued in the Borough of Manhattan in November was not so very much larger than in the period of depression of the year before, the increase in estimated cost of the new undertakings is decidedly marked. For example, in the month named, 52 permits were issued for new building work involving an outlay of $6,251,180, while in the same month in 1907 there were 39 permits issued for building improvements to cost $2,683,140.

In the Borough of the Bronx the number of permits issued in November last was very nearly double the number issued in the same month in 1907, the figures being 200 and 118 respectively. The amounts involved, however, show a still greater difference, the value of the new work projected in November last being valued at $4,418,925, as contrasted with $1,409,705 in the corresponding month of the year before. For the 11 months of 1908 the Borough of Manhattan shows an increase over the corresponding period of the year before of a trifle over $6,250,000, while in the case of the Borough of the Bronx the first 11 months of 1908 shows a falling off of a little over $9,500,000.

In Brooklyn there was a revival of activity in building and 695 permits were taken out in November for improvements costing $4,901,208. These figures compare with 407 permits for improvements costing $2,427,125 in November of the year before. For the 11 months of 1908 the record is appreciably less than for the year before, the figures, exclusive of the amount involved in alterations, being $35,936,819, as against $61,472,613 in the first 11 months of 1907. This showing, however, may not be regarded altogether unfavorably, owing to the fact that for several years past Brooklyn has witnessed an unprecedented amount of building, especially in the suburban districts, where farmlands were turned into house lots and improvement work was conducted upon a gigantic scale.

Building in the Borough of Queens was also very active during November last, plans having been filed for 324 new buildings, estimated to cost $1,282,133, while alterations increased this amount to $1,360,152. In the same month in 1907 plans were filed for 197 buildings costing $671,370 and alterations to 55 buildings amounted to $50,736, making a total of $722,106.

Oakland, Cal.

Usually when the rainy season begins building operations fall off very perceptibly, but this year appears to be an exception to the case, for notwithstanding the rainy season is close at hand the amount involved in building construction in Oakland steadily increases. The 293 building permits granted by the Board of Public Works in November involved a total estimated outlay of $538,153, which was an increase even over the good record of October, which stood at $526,302. It is interesting to note that of the November total $498,268 represented new construction, while the remainder was for alterations, additions and repairs.

Omaha, Neb.

A feature of the present building situation is the tendency toward the erection of more expensive structures for business purposes. This is seen to some extent in the number of permits issued in November, which were 96, as compared with 106 issued in the same month the year before. The estimated cost of the building improvements is placed at $420,135, while in November, 1907, the total was $381,765.

Operations for the 11 months of the year just closing are, however, somewhat behind those of 1907, although the difference is very slight, the figures being $4,212,025 and $4,256,868 respectively. It is felt that the permits likely to be filed in December will bring the total for 1908 ahead of that of the previous year.

Philadelphia, Pa.

Building operations in the city during the month of November show a moderate gain over those of the previous month, but it is when we make comparisons with the same month in 1907 that we are able to note the extent to which confidence has been restored in the building trades. Then the amount of work undertaken reached but a little over $1,000,000, while from statistics of the Bureau of Building Inspection this has been more than doubled during November last, when 673 permits for 1116 operations at an estimated cost of $2,316,590 were issued. The month's business is considered by the trade to be pretty close to normal for the season of the year, although the total for the 11 months of 1908 still shows a decided falling off when compared to the same period of the year before, the decline in dwelling operations alone amounting to over $5,000,000.

It is particularly interesting to note in the November statistics the marked increase in manufacturing and warehouse operations. The generally improved conditions and the confidence in future prosperity by manufacturers is responsible for a good share of the work of this class, which during November ran close up to $350,000. Municipal work has helped the situation to a material extent, contracts for schools amounting to $370,000 being let by the city, while proposals have and are still being taken for over $500,000 for additional school buildings, with several more in contemplation.

Suburban building is moving forward at a rapid pace for this time of the year, while considerable work of a general nature in nearby towns is being figured on by local builders who usually extend their operations in those directions.

Business on the whole is on a better basis, financial matters are more favorable and the trade on the whole is encouraged by the situation, and it is now believed the volume of business during the coming year will be fully up to, if it does not exceed, the normal.

Rochester, N. Y.

As compared with the same month in 1907, November buiilding operations as indicated by the report of Fire Marshal Walter show a gratifying increase, although the total was considerably under that for October last. The fact that this was the case is not altogether surprising when it is remembered that the late fall and winter of 1907 marked the period of extreme depression in business and financial circles. If one were to express surprise at all, it would be that November, 1908, did not show a much larger increase over the same month in 1907 than it does. According to the figures of the authority noted above, the value of the building improvements for which permits were issued in November last was $417,108, as against $572,967 in October last, while in November, 1907, the total was $344,260. An interesting feature of the building statistics of the city is found in the fact that the total for November, 1908, was the largest for that month in the last six years.

The total for the 11 months of 1908 was $4,628,982, whereas in the corresponding 11 months of the year before it was $6,609,470, this being by far the largest total for 11 months in many years, if not in the history of the city.

San Francisco, Cal.

Builders report the outlook for winter work rather more favorable than it was earlier in the season, the chief factor in the improvement being the increased quantity of money available for building purposes. More money was loaned in this city for building purposes during November than in any previous month for more than a year past, notwithstanding the fact that practically nothing in this line was done during the first week of the month, when the public was more or less engaged with the election. As regards the building record, the showing is smaller than might have been expected, the total of building permits for the month running nearly $750,000 behind the record of October. The total estimated value of the buildings for which permits were taken out during the month just closed was $2,659,326, as compared with $3,403,897 for the month of October and $2,300,000 for the month of November, 1907.

One unexpected feature of the building situation is the return to favor of the taller sort of office buildings. For several months past it has been held that the demand for office buildings had been met, that money could no longer be had for tall buildings and that for the next year or more three and four story buildings would be the rule. Now, however, it appears that much more money is going into buildings ranging from six to ten stories in hight than into the three and four story structures.

The property owners in the burned hill district west of Powel street are still endeavoring to get some modification of the building law which will permit of the rebuilding of this section. The claim is made that owing to the hilly nature of this section it will never be business property, and that owing to the small size of the lots the building of brick buildings for other purposes is impracticable. The fact that these hills are still unredeemed from the effects of the great fire, while all other parts of the city have been largely restored, is evidence that there is some real trouble.

Another change in the building ordinance has been proposed by the San Francisco Real Estate Board. This provides for the extending of the fire limits one block west to Franklin street instead of Van Ness avenue, thus putting both sides of the latter inside the fire limits.

The Builders' and Masons' Association of San Francisco held its thirty-third annual banquet at the St. Francis Hotel on November 28. Among the guests were Mayor Taylor and a number of prominent architects. James A. Wilson was toastmaster. Several papers were read dealing with the early history of the organization, the lime question, the brick "trust," the labor question, the rebuilding of the city and the relations of the Builders' and Masons' Association with other similar organizations in the city. These were interspersed with songs and comical recitations.

Seattle, Wash.

The monthly report of the Superintendent of Buildings shows a heavy increase in the number and value of the permits issued for building improvements in November as compared with the corresponding month the year before. According to the figures 1066 permits were taken out, calling for an estimated outlay of $1,253,180, while in November 1907, there were only 781 permits issued for building improvements costing $435,923. The increase over 1907 is probably the most pronounced gain ever witnessed in local building and, of course, is due very largely to the fact that the fall of 1907 was the period of extreme depression in all lines. Slowly recovering from the effects of the panic, building operations steadily gained momentum and during the summer and fall were in full force, stimulated also by the relatively low cost of lumber and other building materials. The only large permit issued in November was that for the Armour Building, to cost $180,000. Outside of the few other permits ranging from $30,000 to $50,000, the great mass of the work represents dwellings.

St. Paul, Minn.

The number of building permits issued for November, 1908, was 259, representing an aggregate value of $910,135, as against $683,366 in November, 1907. The figures show last month was the banner November in the history of the city.

The City Council has yielded to the requests of those interested in the development of the Midway district and ordered the vacation of all the streets in the tract bounded by University, Thomas, Fairview and Aldine avenues. Plans are now being drawn up for the erection in this district of wholesale buildings, warehouses and elevators to cost upward of $5,000,000. The object in vacating the streets was to enable the Minnesota Transfer Company to lay trackage in the district and thus provide facilities for handling the business of the wholesale firms that have signified their intention to locate here within the next few years. The district is located midway between Minneapolis and St. Paul, and within easy access of every line of railroad that enters either of the two cities.

The site of the State Agricultural School at St. Anthony Park will be the scene of an enormous amount of building during the ensuing year. The regents of the University of Minnesota have announced that building work is projected to cost about $600,000. Among the new buildings to be erected are a women's dormitory, to cost $150,000; a recitation hall, to cost $100,000, and a laboratory building, to cost $200,000. Work will not begin on any of the structures until spring.

The marked falling off in the cost of materials has resulted in the erection of an unusual number of dwelling houses of the cheaper variety. Aside from four permits issued from the building inspector's office last month for business structures practically every permit given out was for a dwelling, and the bulk of them under $5000. Building material shows a falling off in cost of nearly 15 per cent. from the prices of 15 months ago, but the tendency within the past few weeks is toward the return of higher prices.

At the annual meetings of the St. Paul Builders' Exchange, held at its rooms in the Ryan Building on December 8, various reports were presented showing the exchange to be in a flourishing condition and doing excellent work for its members. The election of officers resulted in the choice of William Rhodes for president, Andrew Rankin for first vice-president, A. Dalhman for second vice-president, A. C. Raymer for treasurer, and A. V. Williams for secretary.

St. Louis, Mo.

Judging from the amount of work which local architects have on their "boards," the coming spring is likely to witness a very gratifying degree of activity in the house building line. The showing made by the report of Building Commissioner Smith for November, while considerably under that for October, indicates a heavy increase in the amount of new work in prospect, when contrasted with the figures for the same month of 1907. An increase was naturally expected, as the comparison was with a period of extreme depression; but the figures are much more favorable than could have been foreseen. According to the authority in question, 614 permits were issued for building improvements to cost $1,366,511, of which 199 permits were for new brick structures costing $1,199,025. In November, 1907, 453 permits were taken out for building improvements costing $789,186.

For the 11 months of 1908 there were issued 8290 permits for improvements aggregating an estimated outlay of $19,903,910. The greatest activity was in April, July and October, the banner month being July, when 854 permits were issued for improvements costing $2,781,528.

Tacoma, Wash.

As an evidence of the revival of building activity as compared with the panic period of 1907, it is interesting to note that in November 166 permits were issued for building improvements costing $296,180, as compared with 130 permits for improvements costing $150,250 in November of the year before.

The annual banquet of the Builders' Exchange, held at the Commercial Club on the evening of December 5, was a most enjoyable affair. The gathering was thoroughly representative, and the speeches pertinent and highly entertaining. The toastmaster of the evening was F. B. Cole of the *West Coast Lumberman*. There was an address of welcome by President James Thomas, followed by an interesting talk on "Manual Training of Future Builders" by Prof. O. L. Whitcomb. The "Past and Future Building" was discussed by F. L. Hebblethwaite, building inspector of the city, while Frederick Heath presented some very interesting remarks on "Ancient Architecture and Building." Commissioner H. J. McGregor talked about civic improvements, and W. R. Nichols had something to say about the consumption of home products.

The Reception Committee was composed of J. E. Bonnell, Charles Miller, E. C. Carrell, E. A. Knoell, R. Walker, T. H. Bellingham, Edward Miller, A. S. Black, F. H. Heath.

Notes.

At the annual meeting and banquet of the Master Builders' Association of Utica, N. Y., held on the evening of December 10, Thomas S. Byrnes was elected president for the ensuing year, W. G. Edwards, secretary, and Pierce Jones, treasurer.

Wood the Principal Material Used in Building Construction.

Great as the advance in fireproof construction has been during the last 10 years, there has been no let up in the use of lumber, and both architects and builders find themselves so dependent on wood to-day that they are compelled to admit that the forests of the country are likely to be the chief source of building material for many years to come.

"The use of cement, terra cotta, brick and stone, with a framework of steel, will make it possible soon to do away with wood entirely," is a remark often heard, and, indeed, when one stands on lower Broadway and looks up at the towering skyscrapers, the statement seems to contain much truth. As a matter of fact, however, the popular idea that fireproof materials will do away with the need of using lumber in a comparatively few years is a very erroneous one. All of the various fireproof materials going into the approved construction of the more substantial buildings are used in greater quantities now than the world dreamed of a few years ago, yet the heavy demand for lumber continues.

That wood predominates is shown by the annual building records. Of the permits used for buildings erected in 1907 approximately 61 per cent. were constructed of wood, and the remaining 39 per cent of fire-resisting material, according to a report issued by the Geological Survey on operations in 49 leading cities of the country. These figures are the more significant when it is realized that they only represent the building activities in the largest cities; they do not take into account the construction of dwellings, stores and other buildings in the thousands of small cities and towns scattered over and not included in the 49 cities on which the reckoning is made.

In towns and small cities wood is usually the predominating building material and it is safe to say that if the statistics had included figures for all places of whatever size, the percentage of wooden construction would have been much greater. These figures, as a rule, are only for the corporate limits, and the suburbs of these cities have each very large amounts to be added. The cost, also, is relatively higher in these cities than in towns nearer the base of the supply.

Increasing Durability of Gate Posts.

A sagging gate post, rotted at the ground line, gives the whole place an unkept and rough look, and yet gate posts do rot, and have a habit of getting out of line. The remedy is a very simple one, and very inexpensive as well. First brace the post in such a way as to prevent its falling. Then excavate around it to a depth below the frost line. Pull the post into the proper position and renail your braces. Fill the hole with concrete to a point 6 in. above the ground, and your post will remain in position forever. It will also last for years. When it has to be renewed the old post can easily be pulled out and a new one slipped into the hole in the concrete. According to a writer in a recent issue of *The Concrete Review* the materials required for these repairs are as follows: One bag of Portland cement, 3 cu. ft. of gritty, clean sand, 6 cu. ft. of gravel of a small size. The cement can be obtained from a dealer in the nearest town. The sand and gravel can be obtained from the farm. A wheelbarrow holds about 1¾ to 2 cu. ft. After excavating around the post and bracing in position as shown in Fig. 1, drive stakes and place against them rough boards as shown in Fig. 2, allowing the boards to come 6 in. above the ground line. This makes a box or form around the post into which the concrete is placed.

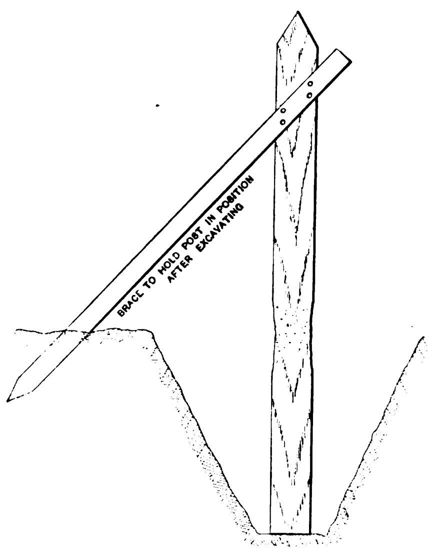


Fig. 1.—Post Braced in Position.

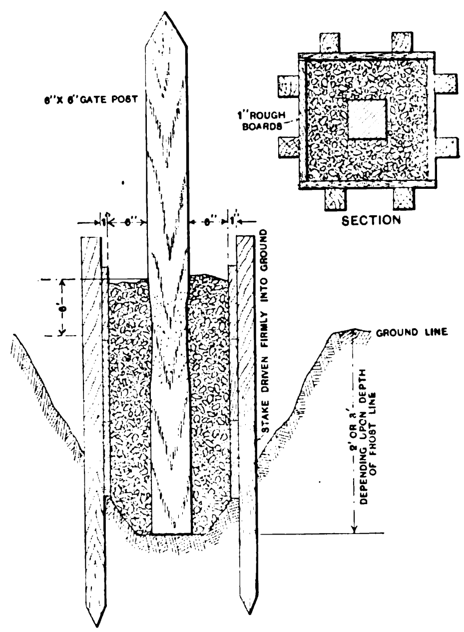


Fig. 2.—Details of the Concrete Work.

Increasing Durability of Gate Posts.

Nail several small boards together and have them so they can be shoveled from easily. Place the sand on these boards and smooth it into about a 3-in. layer. Dump the bag of cement on the sand and mix same together thoroughly while dry. Smooth out this mixture and shovel the gravel on top. This gravel should be thoroughly wet first. Then shovel the whole mixture from one pile to another, adding water enough to make a soft mass, turning over at least three times. Shovel the whole directly inside the box and tamp with a 3-in. by 4-in. piece of lumber. When filled take a trowel and smooth off the top, leaving the whole mass slightly higher against the sides of the post than at the edges. After two days remove the braces and the forms and fill with earth around the concrete up to the ground level. It will take one man half a day to do all the work. The materials, besides the cement, will cost nothing. The cement will not cost over 50 cents a bag.

Modern Silo Construction.

Farmers are coming to realize more and more the value of silage as a cheap, succulent feed, as for dairy cows it is almost indispensible if the best results are to be obtained. Experiments at various stations show that it may also be used successfully for fattening steers, sheep and even hogs. To aid farmers in selecting the type of silo best adapted to their conditions the Iowa Experiment Station has made a thorough investigation of silo construction and published the results in Bulletin No. 100. This bulletin gives, in condensed form, the advantages and disadvantages of all the various types of silos, together with practical hints on their construction. Profuse illustrations aid in making the meaning clear. It is a pamphlet that will be invaluable to any farmer or dairyman who is contemplating the erection of a silo, and a copy can be secured by writing C. F. Curtiss, director Iowa Experiment Station, Ames, Iowa.

Cracking of Inorganic Floors.

BY CHARLES J. FOX, PH. D.

The use of inorganic building materials is rapidly becoming in this country more and more general. Even the wooden floor is passing out of use in all substantial buildings of a public and semipublic character. Cement, tile, marble mosaic, ceramic mosaic, terrazzo and monolithic floors of all kinds are now used very extensively. Architects, contractors and others generally interested in building operations have all had disagreeable experiences with the cracking of many of inorganic flooring materials. The first step in remedying an evil is to discover its cause. In the case of floor coverings the cause of the cracking is often misunderstood. The architect or contractor, when his attention is called to ugly cracks in the floors of recently constructed buildings, will dismiss the subject by declaring that the cracks are due to the settling of the building. Yet this is frequently not the case.

The cracking of inorganic floors is due to two separate and entirely distinct causes (1) to the sinking or settling of the building; and (2) to the shrinkage of the cement mortar in which the flooring material is usually set. The settling of the building is due to defective foundation, and when it takes place there is no rigid flooring material which can withstand it without cracking. The sheering cracks in the floor are evidences of the settling of the building, and any one who has had experience in the matter can distinguish them from the cracks that are caused by the shrinkage of mortar.

Cracks due to the shrinkage of cement mortar show a slight separation, and are usually long winding cracks seen in the center of the floor. Pure Portland cement will set without shrinking or cracking; if it did not do so our present extensive reinforced concrete building operations would be impossible. Consequently, an ordinary cement floor will not crack unless the building settles.

Tile or ceramic mosaic, which are a very common flooring material, are, or should be, always set in pure cement upon a concrete foundation. Marble mosaic and terrazzo, the latter a form of marble mosaic made by sprinkling marble chips on a surface of cement before it is set, are nearly always set in a foundation of cement adulterated with lime. The reason for adding lime to the cement is a very strong one. Marble mosaic and terrazzo floors have to be rubbed down and polished to a smooth surface after the cement has set. Materials used for this operation are rubbing stones and sand or other gritty substances. Pure cement sets so hard that it is very difficult to cut it with ordinary sand. By the addition of lime, however, the cement is much softened and can thus be polished almost as easily as the marble tesseræ of the mosaic, or as the marble chips of terrazzo flooring. If, as is seldom ever the case, lime is not added to the cement mortar, the polishing of the surface is a very difficult operation and adds materially to the labor and expense of a marble mosaic or terrazzo floor. A lime mixed cement mortar is far easier to handle than the pure variety, and the temptation to use it in place of the latter is one which many tile setters and nearly all marble mosaic or terrazzo workers are unable to withstand.

Lime adulterated cement always shrinks in setting, and if the surface is at all extensive this shrinkage causes the floor to part in ugly cracks. It is the rarest thing to find an uncracked marble mosaic or terrazzo floor, unless it is only a few square feet in area. In many of the finest buildings in this country these floors have been used, and in about every case the floors have cracked. One of the most conspicuous examples is the floor of the Library of Congress at Washington. This building is rightly supposed to be one of the finest in America. It was completed only about 10 years ago. Already its marble and terrazzo floors are covered with ugly cracks and patches. These are not due to the settling of the building, but to the shrinkage of the cement mortar, to which lime was added. If the same floors were covered with clay tile or with pure Portland cement it is doubtful if a single crack would be visible on them.

Cracked floors are very annoying in building operations, and the first step in correcting them is to understand the cause of the trouble. It is by no means always due to the settling of the building, but far more frequently to the shrinkage of the lime adulterated cement in which the flooring material is laid. A knowledge of this fact is essential to all architects, builders and contractors.

Faults in Varnish and Varnishing.

In the practical application of varnishes of all kinds one meets with many mysterious occurrences in the way of varnish going wrong and of which the cause is often difficult to unravel, but the painter should be thoroughly impressed with the fact that observation, time and knowledge will unravel them. The main thing is to look for general causes acting in particular ways by experiment if need be, such, for instance, as the influence of the atmosphere, mixtures of various unlike and incompatible substances with each other, and in some cases want of honest and fair dealing on the part of those who supply materials and even of those who use them. Faults in varnish and varnishing, says an English writer in a late issue of the *Decorator*, do not always develop themselves all at once. Some perhaps can by a skillful hand be detected and remedied at the moment of application or shortly afterward, others come forward only by time. They may be traced to four sources: Atmospheric causes; local conditions; the manufacture, and the varnisher. These we may briefly consider in order, and hint at their remedy.

Faults Due to Atmospheric Causes.—Chill cracking—that is, very fine cracks, extending in all directions as though the varnish had begun to crystallize. Usually develops soon after the varnish has become dry, and mostly in winter time or on work exposed to cold winds. Remedy is to apply warmth.

Pin Holes.—Little holes as though made by a pin point, the cause, apparently, of a chill when the varnish is fairly under way of hardening. There is no cure but heat and time.

Curdling.—Much like the curdling of milk. This effect is generally found when two kinds of varnish, particularly if of two opposite characters, are mixed together; more likely to occur in cold weather than in warm weather.

Clouding Whitening.—A varnished surface toward a window may appear brilliant; the other side, away from the light, cloudy and dull. The cause is moisture in the air, which may be due to the weather or to a damp floor. Surfaces varnished in winter and damp weather on an apparently dry but really damp surface will show this fault. A bright sunny day will often cause the defect to disappear. The remedy is obvious, and consists in the application of heat or light. Spirit varnishes are specially prone to this difficulty, and should be applied only in a dry room heated to 70 degrees F.

Turning Blue.—A film of blue, on which one can write with the finger, covers the surface. Cause is coal gas. Remedy: More air and sunlight. Moisture will temporarily give a blue color to varnish; heat dissipates this film.

Faults Due to the Local Condition.—By local condition we mean here more particularly the condition of the surfaces on which the varnish is being applied. It is at least obvious to a practical man that unless the surface of the work is in a good condition the best results cannot be expected; some or all of the defects traceable to want of perfection of the surface are due to it being unclean or greasy, generally to spots of oil from tools in working it, or oil from the oily skin of the hand. Cabinet makers are not always as careful as they might be in preventing the work getting spots of oil on it from their tools before the work is primed; varnish rubbers may be at fault. An oily chamois is another cause of the difficulty. Especially should the workman never forget that the human hand is always oily from the oil glands in the skin, more so when it perspires, and the work should not be handled with sweaty or wet hands.

Pits and Peeling.—The varnish crawls into blotches, and is due to grease on the painted surfaces. Peeling in a mysterious and often in a single spot (round), due to failure of the priming to enter the wood because of oil (generally tool oil) previously taken up by the wood.

Rusting.—An appearance of having been under a stream of water from rusting iron appears in spots. This may be due to a surface which at some time within several months had been washed with lye water and not thoroughly rinsed off, wetting by rainwater, or to ammonia water or to gas.

Blistering is a most common fault in varnishes, and is due to a great variety of causes, some of which are: Oil on the surface by the means as above stated; too much japan in colors, the shellas in the japan the cause of the blistering; wood not dry; water left in a porous rough stuff; benzine in varnish or colors; too great a heat, as the concentration of sun heat in one spot by a "bull's eye" in a pane of the shop window. Always the result of vapor or gas under the influence of heat.

Faults Due to the Manufacture and Quality of Varnish.—These are very difficult to find out. Sweating may be the fault of the varnish, because possibly oils other than linseed may have been used, or because the gum was not properly liquefied before it was incorporated with the oil, or the gum and oil were not properly amalgamated by heat, or the varnish used when too fresh.

Sweating, however, may be caused by failure to allow varnish time before being rubbed. It may also be due to dampness in the atmosphere, also to the oil varnish having become fatty by exposure to air.

Blooming is often due to similar causes as sweating, with which it is often confused, indeed the two faults are rather closely related, and it is, perhaps, but a question of degree.

"Deadening" or "Sinking," Change of Color, &c.—Varnish made from Kauri gum and probably Manila copal, quickly loses its luster, although not necessarily its wearing power. This should not, however, occur for several months. If the dullness comes immediately it is probably not the fault of the varnish, or if it is that fact can be positively proved by experiment with a remnant of the same lot if any remain.

The method of melting and mixing the gum with the oil, &c., in making the varnish may affect its luster. The green tinge sometimes seen in varnish is probably due to the action of the fatty acids of the oil affecting the copper of the vessel in which the varnish is made. The principal cause of immediate deadening and loss of luster in good varnish, however, is to be looked for in two directions: 1.—In the condition of the atmosphere; moisture tends to separate the fine particles of gum from the dried oil. 2.—In the condition of the varnish. To find out whether these causes operate it is best to test it on the various surfaces. Experiment with the varnish over a similar coat; if porous, putting the sample under strong heat for several hours to see if the oil is driven in and taken up by the coats beneath and luster lost in this way. Finally as a cure try the effects of heat and sunlight.

Perishing.—The varnish may lose luster without perishing. Immediate or rapid perishing may be caused: 1.—By putting the surface under a hot summer sun too soon; allow it plenty of air, but no excessive sun in summer for ten days. 2.—The effect of ammonia vapor or water. 3.—Varnish made of the cheaper gums. 4.—The use of too much manganese or other drier in varnish or paint exposed to the sun in direct rays.

Sagging Down.—The varnish appears in festoons or curtains. This is due to the use of too heavy a load of varnish on the brush, and want of courage to spread it vigorously before it sets. Also due to carelessness. In paint little streams appear or brush marks, due to using too much paint and to mixing it too thick or too thin with turpentine.

Brushes.—Bits of pumice stone or dirt in varnish brushes will give a good deal of trouble. But a source of danger is in using brushes which have been kept in water and not in varnish, as they should be.

Varnish.—Using the last one-eighth of the can of varnish will give trouble. Being economical to so save, it should be kept for rough work.

Adding oil or turpentine or benzine to varnish to make it work easier, and not giving time to amalgamate, is a cause of streaks and marks and blooming, and often want of uniformity in varnishing. In winter varnish often gets thick and difficult to work, and a user is tempted to thin it down; the better plan is to warm the varnish.

Preservation of Steel Embedded in Concrete.

Steel embedded in concrete is preserved against rust and corrosion, being found intact and free from scale after many years. The latest proof of this assertion is found in a report on some tests made by Dr. Glazebrook, director of the British Physical Laboratory, which report has just been communicated to the London *Times* by Sir John Brunner, at whose request the experiments in question were undertaken. The report is as follows:

A strong wooden box was made and divided into five partitions, each partition being 12 in. long, 7½ in. wide and 7½ in. deep. Specimens of mild steel of the following dimensions were prepared: (1) 1 in. diameter, 8 in. long, turned all over. (2) 8-in. lengths cut from a 1½ x 1½ in. bar, with the scale left on. The partitions were half filled with good Portland cement concrete, and a specimen of each kind laid on the top, and the partitions were then filled up. This was done on December 21, 1906. The blocks were covered with water several times a week for a year, and for three months afterward were left in the open, subject to the weather. On April 20 one of the blocks was removed from the box and broken up, and the specimens removed. On examining the specimens carefully no trace of any action by the cement could be detected. The turned specimen was practically as bright as when it was put in, and the scale on the rough specimen was undisturbed. To test the possibility of any slight action, the surface of the turned specimen was polished and etched and examined under the microscope side by side with a specimen of the same material cut from the center of the bar. No difference in the microstructure of the two specimens could be detected, and the conclusion is that in 16 months no action has taken place between the metal and the concrete. It is proposed to immerse one of the remaining blocks in the comparatively warm water of the cooling pond for six months and then to examine the specimens.

New Publications.

Two-Family and Twin Houses.—Selected and compiled by the editor of the *Architects' and Builders' Magazine.* 127 pages. Size, 10½ x 7¾ in. Illustrated. Bound in board covers. Published by William T. Comstock. Price, $2 postpaid.

This work has been prepared to meet the demand for improved house accommodations on comparatively small lot areas, and consists of a variety of designs contributed by leading architects in all parts of the country, showing the latest ideas in planning this class of dwelling in city, village and suburb, together with very complete descriptions covering all the latest improvements in sanitation, heatin, lighting, &c. The early pages of the volume are devoted to descriptions of the various designs illustrated, together with two detailed specifications and estimates of cost. Following these are half-tone illustrations in perspective, many being direct reproductions from photographs of the completed buildings, together with floor plans showing the arrangement of rooms. In connection with each design is given the location, also the name of the architect, whose address will be found in a list of contributors among the introductory pages. In addition to two-family and twin houses are several designed for three-family, and in one case a four-family house is presented.

The arrangement of rooms offered in the various designs is sufficiently wide to afford valuable suggestions to the architect and prospective builder, and will be an acceptable addition to the literature of this subject.

Some Comments on Wood Pipe.

Wood pipes made from full sized logs have been in use for many years, both in European countries and in the United States. The water supply of many of the older cities on the Atlantic Coast was formerly distributed entirely through such pipes. In numerous instances they have served for many years, and occasionally at the present time such pipes are dug up in the course of modern improvements and are found to be in a very good state of preservation. In several instances such pipes are still in use after a service extending over a period of 50 or 75 years. At Fayetteville, N. C., a line of 2 miles of wood pipe was laid in 1829; it is sound and in constant use at the present time. A large wood stave pipe which supplies the pumps of the city water works of Manchester, N. H., was laid in 1874, and is said to have caused no trouble and has not been disturbed since.

The pioneers of the Atlantic Coast used wood pipes made by boring a hole lengthwise through a full sized log. The pioneers of the Pacific Coast use wood for pipes also and with greater economy, because of the advantages gained by virtue of past experience and modern manufacturing methods. To-day wood pipes are made of staves, so manufactured as to give a cylindrical shape, which is absolutely uniform and waterproof. The pipes of small size, up to 2 ft. in diameter, are made from staves of special pattern, with grooved edges, and are built up in the factory. The pipe is wound from end to end with steel wire and coated with a mixture of asphalt and tar for preservative purposes. The thickness of the staves and the pitch of the winding vary according to the pressure under which the pipe is to be used. Large pipes over 2 ft. in diameter are generally built up at the point they are to be used, the staves being placed so as to break joints. These staves are made 6 in. wide and are shaped with plain, bevel edges, and a curvature to conform to the diameter of the pipe. Special patented bands girdle the pipe and are drawn up tight, so as to close all joints.

Practically all of the wood stave pipes in use on the Pacific Coast are made of high grade Douglas fir, which has been well seasoned. The qualities of this wood combine the essential qualifications of strength and durability, which are necessary for pipe staves. All of the staves are made from flat grained lumber, and the wood used is of uniform growth.

It is a well-known fact that timber saturated with water and protected from outside influences is practically everlasting, and, therefore, if an underground wood pipe runs full of water for sufficient intervals to insure complete saturation of the wood, aided by the water pressure, the life of the pipe is greatly increased. When used above ground in contact with the air, under the above conditions, the time of service of wood pipe varies with climatic conditions. Ordinarily, however, the life can be estimated at from 40 to 50 years. Manufacturers of wood stave pipes point out the following advantages of their product over the more commonly used cast iron and steel pipes for water distributing systems:

1. Wood pipes are equal in durability to those made from cast iron and four times more durable than steel.

2. Wood pipe costs one-quarter as much as cast iron and one-half as much as steel. It is much more easily handled and requires less labor to lay. It is easier to tap for connections.

3. Wood pipe has greater discharging capacity than cast iron or steel. The inner surface of wood pipes becomes smooth with use, whereas iron becomes covered with large tuberculizations.

4. Wood pipes are not affected by electrolysis, while cast iron and steel pipes are often entirely destroyed.

5. Wood is a poor conductor of heat. The water flowing in a wood pipe is kept cooler in summer and warmer in winter. Water freezing in iron pipes causes them to burst; wood will expand sufficiently to obviate this difficulty.

Imitation of Tile Work on Plaster.

In explaining the method of treating plaster walls that are marked off in the shape of tiles so as to give them the mottled or blended effect that finished tiles show, a recent issue of the *Painters' Magazine* publishes the following in reply to an inquiry of one of its readers: The walls should be treated in the usual manner as is done in ordinary painting or enameling. First apply a thin prime of lead in oil and very little or no drier, using raw linseed oil, not boiled oil. When this is dry and hard, give a coat of glue size, in order to save in the number of coats of paint. Then build up with as many coats as in your judgment are required to give you the proper ground for enamel finish. If you desire to blend in colors, this should be done on the last coat of ground, which should be flat and finished with damar or white enamel varnish. If the job is to be in pure white, the finishing coat should be a good white enamel paint, slightly blued. If the tiles to be imitated are the unglazed variety, then the finish should be in eggshell gloss effect, which may be had by holding the tints, if any, flat and finish with a flat varnish, that can be obtained from any varnish manufacturer or supply house.

Beware of Unauthorized Solicitors.

When a stranger, holding no credentials from a known and responsible concern, offers to take subscriptions for any periodical at less than the regular advertised price, he should be recognized at once as a swindler. Every little while it is necessary to warn the public on this point. Men go round the country soliciting subscriptions and offering to give them for cut rates if they cannot get the regular price. With the offer of several high-class publications at a greatly reduced rate as his bait, a traveling solicitor giving his name as Bert L. Brown has been victimizing residents of southern Indiana. He has no connection with the David Williams Company's publications, and attention is called to the fact that our solicitors carry a receipt book of the company with credentials authorizing them to collect, signed by Benj. F. Stower, office manager.

A Large Wood Box Making Plant.

The contract which calls for the rebuilding of the entire box making plant of the Atwood-McManus Company, destroyed in the second fire at Chelsea, Mass., will involve the erection of a power plant with two very tall chimneys; a receiving building 345 ft. long, located on the Eastern Division of the Boston & Maine Railroad; an office building and stable, 200 ft. long; a sawdust and kindling wood building and factory building, 350 ft. long by 200 ft. wide, and two stories in hight, and a warehouse, 375 ft. long by 68 ft. wide.

The buildings, which are to be of heavy "mill construction," resting on reinforced concrete foundations, will be so laid out that the raw lumber is transported by conveyors 20 to 25 ft. wide through the various buildings to emerge in the form of finished boxes. When the original plant was destroyed it contained over 6,000,000 ft. of seasoned lumber. The architects and engineers are Lockwood, Greene & Co., Boston, and the general contractor is Frank B. Gilbreth, 34 West Twenty-sixth street, New York City.

The building site forms a right triangle, with one side 800 ft. long, the other 550 ft. long, and the hypothenuse formed by the tracks of the Boston & Maine Railroad. We understand that about 800 men will be employed in the work.

CONTENTS.

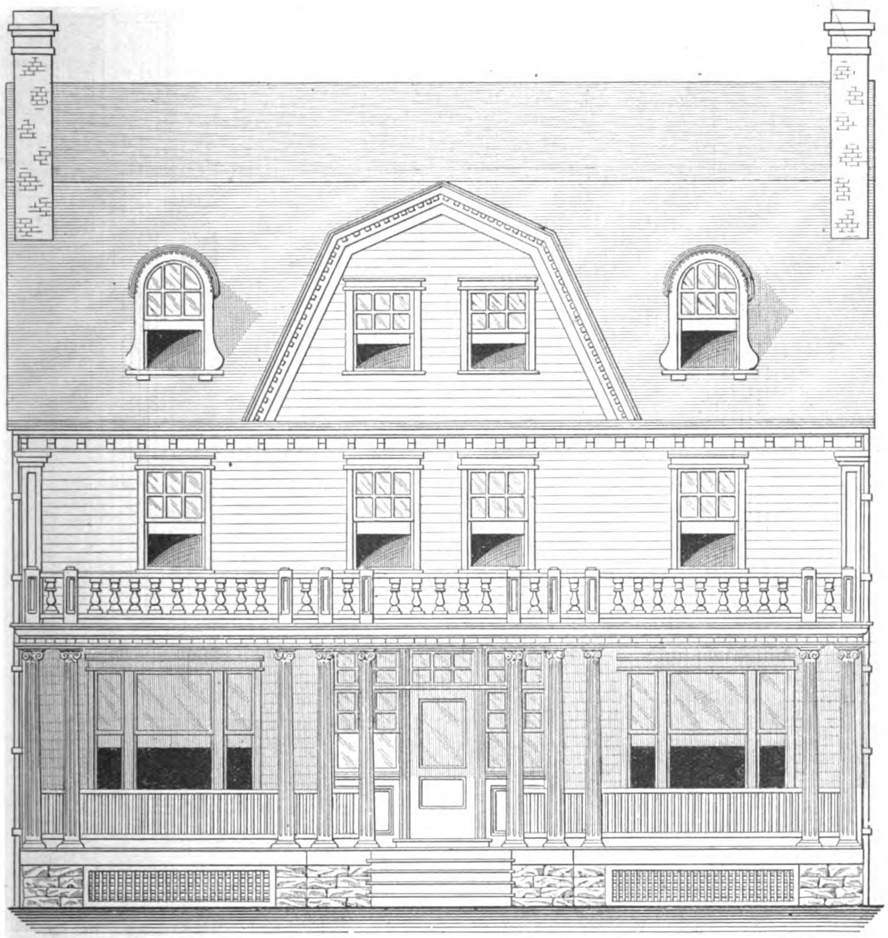
Carpentry and Building

New York, February, 1909.

Colonial Dwelling Arranged for Two Families.

A STYLE of dwelling which has been attracting a great deal of attention for some little time past is that arranged for occupancy by two families, whether it be that in which each family has an entire floor or that where each family occupies one-half of the building divided vertically by a party wall from cellar to attic. Vast numbers of these houses of both kinds have been erected in the recent past and constitute a notable feature of many of the current building operations in and about leading cities of the country. The type of dwelling is one which affords opportunity for varied architectural treatment and in the illustrations which we present upon this and the following pages will be found an interesting example of a Colonial house which embodies features likely to command the consideration of many of our readers. It will be observed that in its arrangement it is of a somewhat modified style, and that while each family has rooms on the several floors the main or front hall with stairs leading to the second floor are common to both families.

The building is of frame construction with field stone foundation walls, the outside of the walls above grade being faced with blue limestone ashlar 6 and 10 in. in thickness. It is bedded in mortar composed of one part Atlas Portland cement and one part sand. The entire frame is covered with ⅞-in. hemlock boards tongued and grooved, put on diagonally, over which is placed a layer of building paper, this in turn being covered with 5-in. beveled siding laid 4 in. to the weather. The roof is covered with cedar shingles laid 5 in. to the weather and every sixth course doubled.



Front Elevation.—Scale, ⅛ In. to the Foot.

Colonial Dwelling Arranged for Two Families.—A. Howard Fidler, Architect, Jamestown, N. Y.

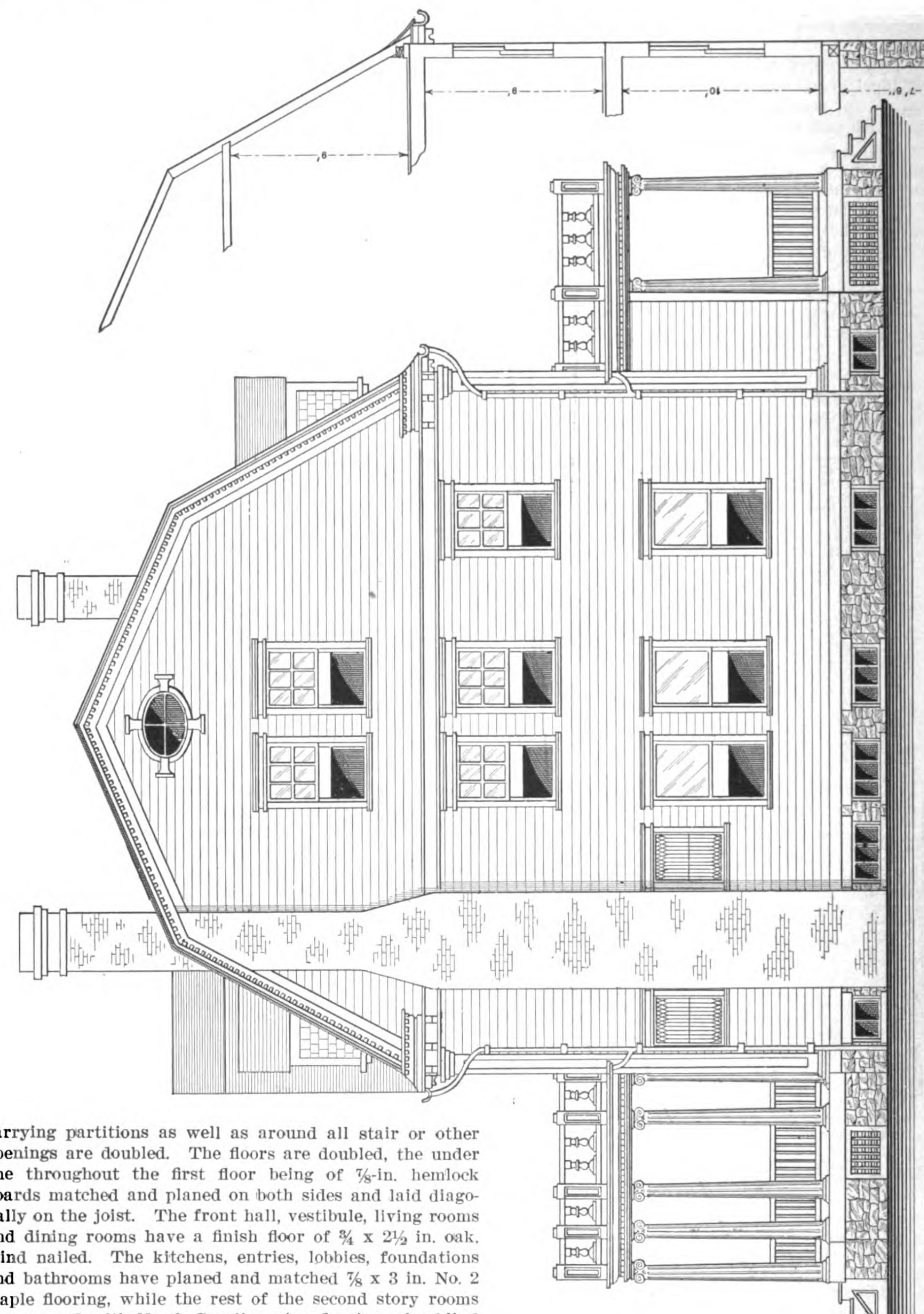
According to the specifications of the architect the basement has a concrete floor consisting of 3 in. of broken stone, over which is a 3-in. layer of Portland cement concrete. This in turn is covered with a 1-in. finishing coat of Portland cement and sand mixed in equal parts. From the stone division wall in the cellar is built up a 12-in. brick wall extending on the first floor from the front stairs to the rear wall and upward to the attic floor. The front bedrooms on the second floor and attic are separated by partition wall, well filled with mineral wool.

The rough lumber used in the house is hemlock. The sills are 4 x 8 in.; the first and second floor joist 2 x 10 in.; the third floor joist 2 x 8 in.; the collar beams and common rafters 2 x 6 in., all placed 16 in. on centers, while the hip and valley rafters are 2 x 8 in. The outside studs, as well as the partition studs are 2 x 4 in., also placed 16 in. on centers, while the carrying studs are 2 x 6 in, placed 12 in. on centers. The first floor joists are gained into the sills and well spiked and all joists carrying partitions as well as around all stair or other openings are doubled. The floors are doubled, the under one throughout the first floor being of ⅞-in. hemlock boards matched and planed on both sides and laid diagonally on the joist. The front hall, vestibule, living rooms and dining rooms have a finish floor of ¾ x 2½ in. oak, blind nailed. The kitchens, entries, lobbies, foundations and bathrooms have planed and matched ⅞ x 3 in. No. 2 maple flooring, while the rest of the second story rooms are covered with North Carolina pine flooring, also blind nailed and well matched.

The veranda floors are of 1⅛ x 4 in. Southern pine, while the ceiling is of cypress sheathing with a 1½-in. bed moulding. The front door of the house is of cherry 1¾ in. thick fitted with bevel glass panel above and one wood panel below, as indicated on the front elevation. The side lights are glazed with No. 1 double thick glass.

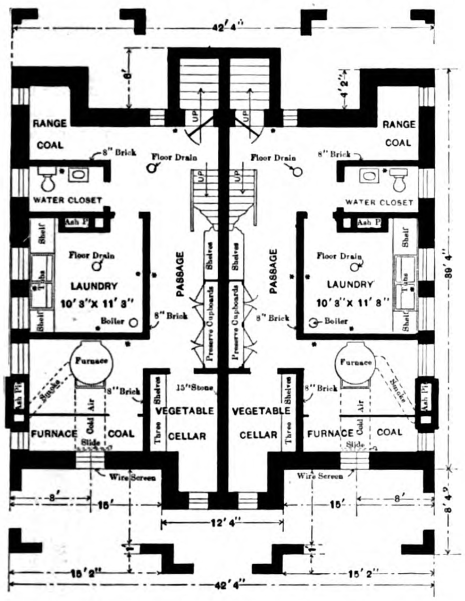
The front hall is finished in cherry treated to one coat of stain and shellac and two coats of dead hard oil finish. The vestibule corresponds in finish with the front hall. The parlors are finished in North Carolina hard pine, being given one coat of shellac and then four coats of white lead and oil paint, each coat being sandpapered. This was followed by two coats of white varnish, each coat being rubbed with pumicestone and oil. The dining rooms are finished in quartered white oak as per the details shown herewith. The kitchens, pantries, lobbies, entries and the entire second floor are finished in common oak, receiving one coat of shellac and two coats of hard oil finish. The laundries are finished with two coats of lead and oil paint.

The doors leading from the front hall are 1½ in. thick with one large panel, as indicated on the stair elevation. The doors leading from the dining rooms are 1¾ in. thick,

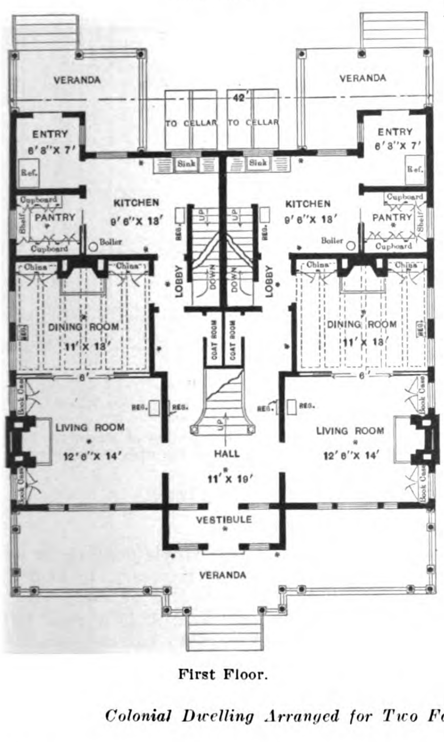


Colonial Dwelling Arranged for Two Families.—Side (Right) Elevation and Section.—Scale, ⅛ In. to the Foot.

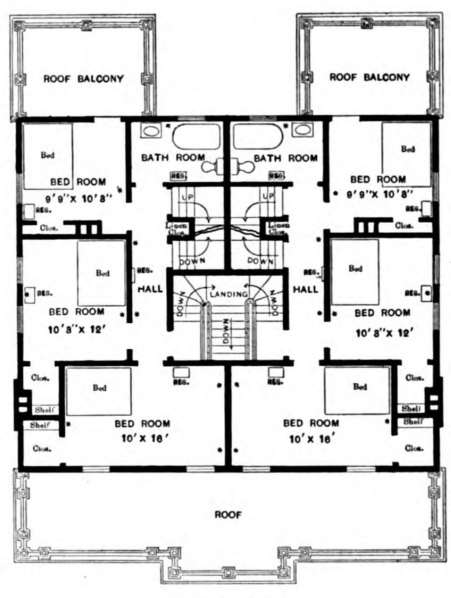
while all other doors throughout the interior are $1\frac{3}{8}$ in. thick, of the five cross panel variety. The front hall, vestibule and living rooms have 1 x 5 in. casings with plain headers, as shown on the stair elevations. The kitchens, pantries, &c., including the second floor, have casings as indicated in the details. The vestibule is wainscoted 4 ft. high with paneled cherry wainscoting. The dining rooms have paneled quartered oak wainscoting



Foundation.



First Floor.



Second Floor.

Colonial Dwelling Arranged for Two Families.—Floor Plans.—Scale, 1-16 In. to the Foot.

with plate rail on top, as shown in the details. The kitchens, entries, lobbies and bathrooms are wainscoted with V sheathing, put on vertically, blind nailed, and with a 3-in. molded cap on top. The dining rooms have a beam ceiling, as per the details, and plastered between beams.

The front stairs are constructed of cherry with 2-in. stringers, $1\frac{1}{2}$-in. treads and $\frac{7}{8}$-in. risers. The newel post is 6 in. in diameter and has a flaring cap.

The building is heated by hot air, the furnaces resting on brick foundations. The registers in the front hall and living rooms are nickel plated and those in the dining rooms are of wrought iron, all others being of plain stock design. The building is wired for electric lighting, having all required switches, cut outs, &c. The feed wires run to a central distributing box on the second floor with meter in the cellar. There is a switch in the vestibule for the vestibule and veranda lights. The entire work is executed in accordance with the rules and regulations of the Board of Fire Underwriters.

A speaking tube extends from each cellar through the kitchens to the upstairs hall. Electric bells to ring in the kitchens are connected with push buttons at front door for each side of the house and one for each rear door. There is also a floor push from each dining room.

The building is also piped for gas with separate pipes for fuel gas to the ranges in the kitchen, all fireplaces, and to the hot water boiler for gas heaters in both kitchens and laundries.

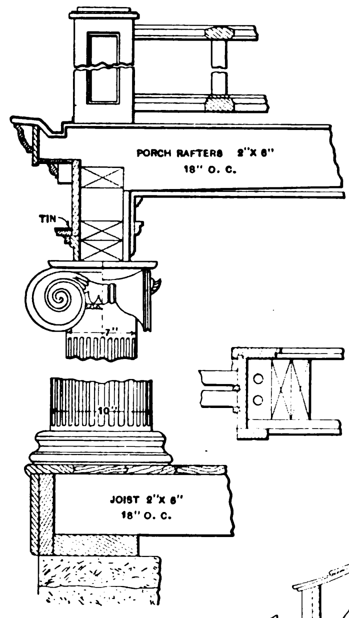
The body of the house is painted a light gray and all trimmings are white. The veranda columns are also white with light gray balustrade. The veranda floors are a dark slate and the ceiling has a coat of shellac and a coat of varnish. The shingles on the roof were first dipped three-quarters their length in Cabot's creosote shingle stain and a second coat was applied with a brush. All the metal roofs were painted a color to match the shingles. Window sashes are black. All interior woodwork has two coats of paint, All wainscoting in the vestibule and dining rooms was given one coat of paint on the back before it was put in place.

In the laundry is a two-part laundry tray with 12-in. back, of Alberene ware. There is also one 30-gal. boiler, with horseshoe burner underneath. Each kitchen has a sink 20 x 30 in. in size with a 12-in. high roll back in one piece; also a 40-gal. hot water boiler, with Lawson thermostat valve connection and heater. In the cellar is a syphon washdown closet, with supply tank of oak. The closets in the bathrooms are of the syphon jet variety, with $1\frac{1}{4}$-in. plain oval seat and cover attached. Each bathroom also has a 5-ft. white enamel 3-in. roll rim tub, provided with combination bibbs, rubber plug and sprinklers, and there is in addition a 12 x 15 in. bowl and 12-in. back of cast iron white enamel, with apron, and supported on hidden brackets, while the lavatory in the cellar is of porcelain enamel 18 x 20 in. in size with 12-in. high back supported on brackets and supplied with chain and stopper.

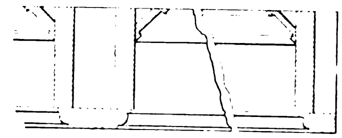
The dwelling here shown was designed by A Howard Findler, 525 Lake View avenue, Jamestown, N. Y.

Suggestions for the Bricklayer.

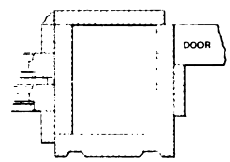
Bricks should be well drenched with water before using, to prevent them absorbing the moisture from the mortar, and to wash the particles of dust and dirt off them. In the summer the bricks should be soaked with water before using, and in winter it is a good plan to have each brick dipped in a pail of warm water. This will



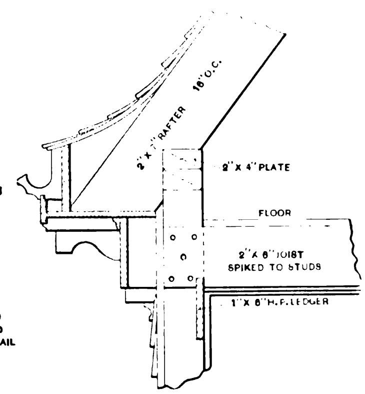
Details of Front Porch Columns and Cornice, Also Section Through Window Frame.—Scale, ¾ In. to the Foot.



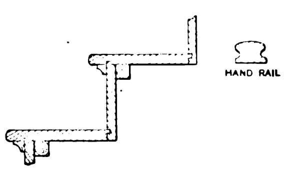
Details of Beams in Dining Rooms.—Scale, 1½ In. to the Foot.



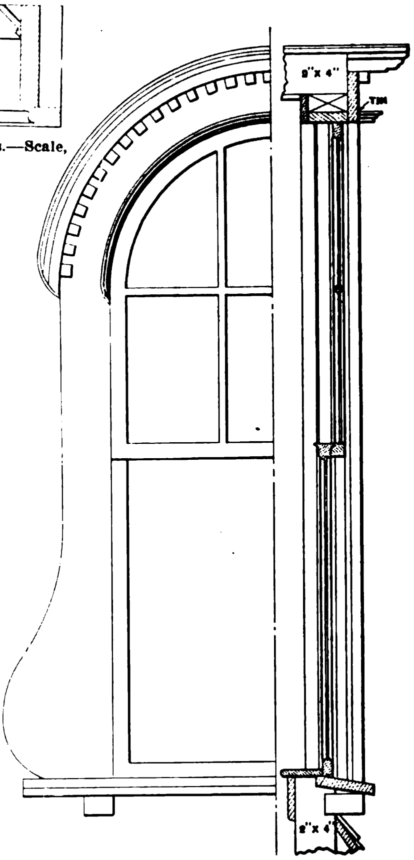
Section Through Vestibule Door Mullion.—Scale, 1½ In. to the Foot.



Details of Main Cornice.—Scale, ¾ In. to the Foot.



Section of Front Stairs and Hand Rail.—Scale, ¾ In. to the Foot.



Partial Elevation and Section of Dormer.—Scale, ¾ In to the Foot.

Colonial Dwelling Arranged for Two Families.—Miscellaneous Constructive Details.

tend to keep the mortar from freezing and prevent the water in the mortar from being absorbed. The whole of the walling should be carried up simultaneously when possible. If it is necessary to carry up one part of the wall before the other, the end of the first portion should be "racked back"—that is, left in steps—each course projecting more than the one above it, but the sum total of the hights of one part above the other should not exceed 3 feet, or it may be difficult to make the joints "line up." When the ends of timbers, such as joists, tie beams, bressummers or other similar pieces are built in brick walls, they should rest in recesses formed by galvanized iron shoes, so that a circulation of air may have due play round the timbers.

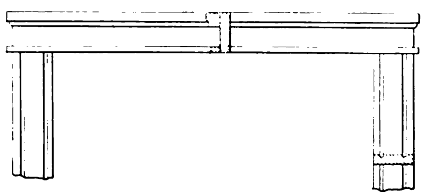
Wooden strips to which to nail the strapping or furring are preferable to scantling; they should be cut to the thickness of a certain joint, and should not be less than 3½ in. wide, and the back edge should be well flushed in with mortar.

In laying brick copings, the hardest and least porous bricks should be used, and laid on edge, set and pointed in cement. In corbeling, the projections of the courses should never be more than one-quarter of a brick, so that each back joint may be kept well within the last course. A less projection is advisable when great strength is required, but in no case where much weight is to be carried is it advisable that the projection of each brick should be more than one-third on the course below.

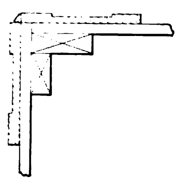
It is a mistake to suppose that semicircular arches have no thrust. When any arches occur near the end of a wall provision must be made for the thrust. The flatter the arch the greater the thrust. New work should butt against old, either with a visible joint, or let into a chase cut for the purpose, if necessary, to bind them together. If required to be bonded at every alternate course, the new work should be built in a quick setting cement, and each part allowed to harden before being weighted. It is bad construction to use bond timbers for nailing on the strapping, and when it can be avoided it is better to use thin strips between the joints in the brickwork, or to employ wooden plugs; the latter is the better method, but is too costly for general purposes.

Struck, or beveled joints, are the best for general work, and they last longer without being impaired; they are formed by pressing back the upper portion of the joint while the mortar is moist, thus forming a sloping surface, which throws off the rain. The lower side is cut off to a straight edge. Joints struck the other way up are common, but should not be allowed, as they leave a resting place for water. Joints should not exceed ⅜ in. in thickness in good work, but in common work, where the bricks are rough and unequal, a thicker joint is permissible; in rough work, the mortar should be quite stiff. Flat or flush joints are formed by pressing the mortar flat, so that the surface of the joint is flush with the face of the wall. In tuck pointing the joints are raked out, and "stopped"—that is, filled up flush with mortar—which is colored and rubbed with a soft brick of the same color. A narrow groove is then cut in the center, and the mortar is allowed to set; then pure white lime putty is filled into the groove, with a slight projection beyond the face of the wall, and a width of about ⅛ in.

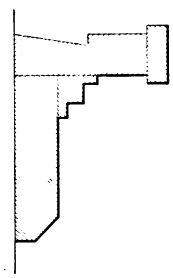
The thickness of brickwork should be measured one brick for every 20 ft. in hight. The bond generally in use in the Dominion of Canada for ordinary brickwork, says a writer in an exchange, is one course of headers to every five courses of stretchers; this makes a pretty solid wall. Drains should be kept as far away as possible from walls that are likely to settle. Four-inch drains are generally large enough to branch into a main drain, for ordinary houses. Hotels, factories, schools and other places where a number of people congregate, require larger branch drains, but the least possible size necessary should be used, as being more self-cleansing than larger pipes. Tile piping is preferred to iron by many even for fixing inside a house, although it is impossible to find a drain of this material of any great length, that has been used for years—that is, not defective in some particular. Iron pipes can be made perfectly water tight, and they have sufficient resisting power to prevent their disruption under ordinary strains.



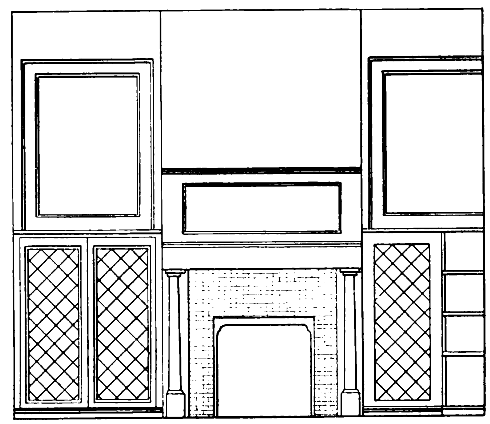
Details of Trim in Kitchens on Second Floor.—Scale, ¾ In. to the Foot.



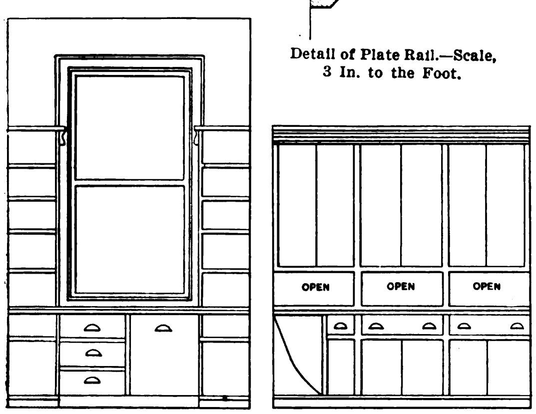
Section of Cornice Boards. —Scale, ¾ In. to the Foot.



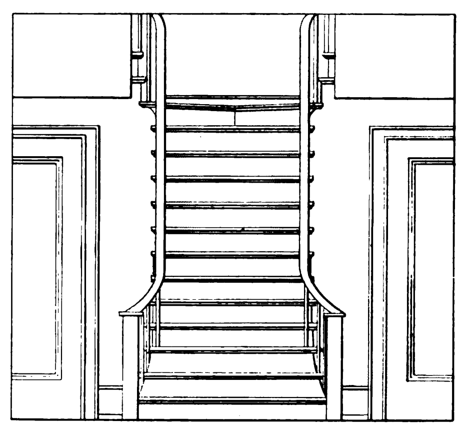
Detail of Plate Rail.—Scale, 3 In. to the Foot.



Elevation and Section of Bookcases in Living Rooms.—Scale, ¼ In. to the Foot.



Section and Elevation of Pantry.—Scale, ¼ In. to the Foot.



Front Elevation of Main Stairs.—Scale, ¼ In. to the Foot.

Colonial Dwelling Arranged for Two Families.—Miscellaneous Constructive Details.

Short and Odd Lengths of Lumber.

The fact that great waste occurs in ordinary lumber manufacturing because short and odd lengths and widths are not used has been mainly blamed on the lumberman. The truth is, however, that the lumberman is practically helpless. He can find a paying market only for the lumber cut from logs of regulation length, as called by the builders and architects. If specifications were drawn for the sizes actually used the short logs would be in demand, and the tremendous present waste due to this cause would be saved.

This fact has recently been brought out in connection with the study of forest utilization now being made by the Forest Service for the National Conservation Commission. One of the schedules of inquiry sent to lumber manufacturers contained a query as to the extent to which more careful specifications of material might reduce waste. Replies to this query show that in some cases as much as 25 per cent. of the felled trees are never hauled from the woods, simply because specifications cling to conventional lengths.

Thus, lumber in long lengths is frequently ordered for use in lengths of from 1 to 6 ft., and yet the short lengths which would exactly and economically meet the requirements cannot be sold.

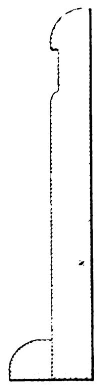
An example is the case of beveled siding. "I have just taken a book issued by a prominent architect," writes the secretary of a prominent Pacific Coast association, "containing about 200 designs of houses, and on all of these designs, I believe that 40 per cent. of the siding on these houses is under 6 ft. in length. At the same time the contractor will order lengths of from 12 to 16 ft. in order to build them."

It has always been the custom in this country to sell lumber in even lengths only, and our prices on lengths under 10 ft. in almost any material are from $2 to $10 per thousand less than for lengths above 10 ft.

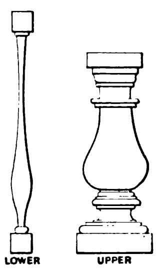
In cutting any kind of finished product, such as flooring, ceiling, beveled siding, &c., in order to grade the lumber in an economical manner, there is bound to be from 5 to 10 per cent. of the lengths under 10 ft. long.

waste occurring from this practice of disregarding the saving of waste in building specifications:

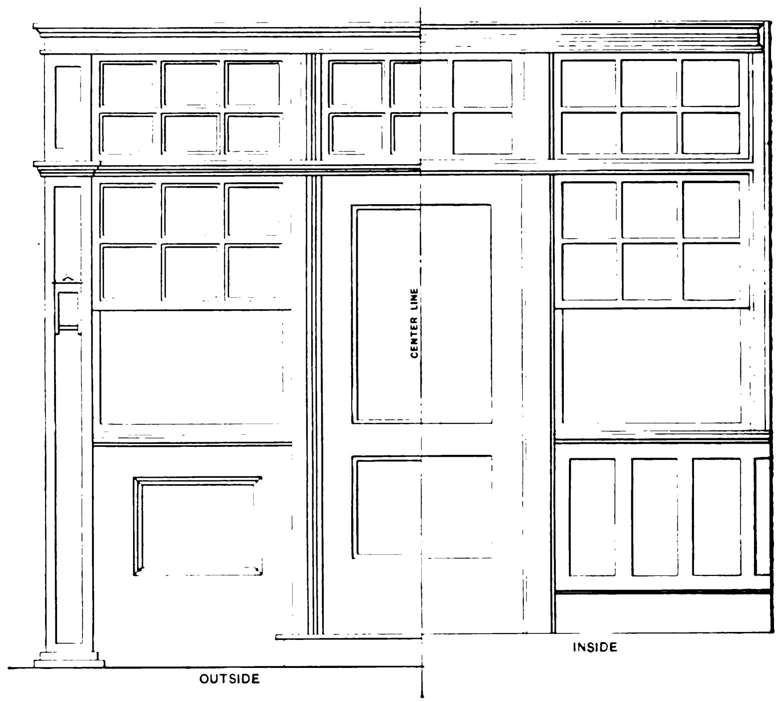
"I think the waste in our timber products caused by this one fact, which you will readily see, prohibits a man from going to the expense of taking any timber out of the woods that he might cut into these short lengths and find a market for, and which gives him no market for the short lengths that do accrue in the ordinary manufacture of logs in longer lengths, will easily run to 25 per cent. of the timber on any section of land."



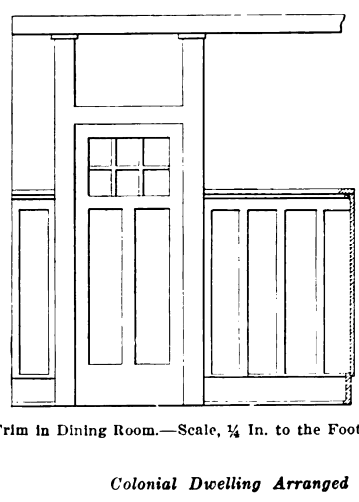
Base.—Scale, 3 In. to the Foot.



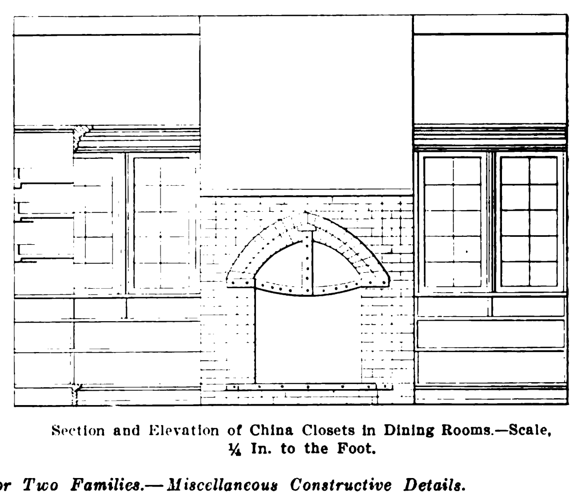
Details of Porch Balusters. —Scale, ¾ In. to the Foot.



Outside and Inside Elevation of Front Entrance.—Scale, ⅜ In. to the Foot.



Trim in Dining Room.—Scale, ¼ In. to the Foot.



Section and Elevation of China Closets in Dining Rooms.—Scale, ¼ In. to the Foot.

Colonial Dwelling Arranged for Two Families.—Miscellaneous Constructive Details.

It is the rule with most manufacturers to burn up all lengths under 6 ft., as there is absolutely no sale for them. While on the other hand the architect and the contractor order their lumber in long lengths with the idea of cutting it up into lengths from 1 to 6 ft. when placing it on the building.

The same writer says that 10 or 20 ft. lengths are commonly specified for the flooring of porches 5 ft. wide. He concludes by making the following estimate of the

It would be a great mistake to charge such waste as this to the voluntary device of the lumberman, who wastes only what he cannot use in his business. The closer drawing of specifications, with a better knowledge of the timber situation, and with more careful regard to the possible use of the short lengths now ignored, would not only help the lumbermen to larger profit but greatly prolong the duration of the present very meager lumber supply of the country.

CAST REINFORCED CONCRETE PILES.

Arranged for *Carpentry and Building* by SANFORD E. THOMPSON.*

THE history and development of both plain and reinforced concrete is now more or less familiar not only to those who are connected with construction work but also to the general public. To-day this material is being so widely applied for construction purposes that one wonders sometimes when the limit of its uses will be reached. The present article aims to give some practical information on a feature of concrete work which must be admitted as quite fundamental, concerning as it does the very foundations of construction.

For centuries the wooden pile has been used, and it is only comparatively recently that the peculiar adaptability of concrete for this purpose has led to its quite general adoption.

Concrete piles are made in one of two ways: (1) By driving a steel shell into the ground, and thus molding the pile in place; and (2) by casting it first and then driving it like a wood pile. The first method, *i. e.*, casting the pile in place, which may be accomplished in several ways, has been and is being used very successfully, but the second and newer method is the one here described.

The data on the cast reinforced concrete piles given in this article were compiled by the writer, under whose supervision the recorded notes were taken for Benjamin Fox, the designer and contractor. The piles were driven for the foundation of the Boston Woven Hose Company's power plant in Cambridge, Mass. In order to treat the subject in the most practical way the design and methods used and the costs resulting on this job are given.

A number of soundings were taken at the site of the power house which indicated a fill of from 6 to 8 ft.; below this, to a depth of 29½ to 31½ ft. from the surface, fine sand and mud (practically all sand); and below the sand a clay hard pan was reached which was tested to a depth of 18 ft. These soundings, together with a consideration of the requirements determined the length of the pile.

The piles were made 30 ft. 6 in. long, 14 in. square at the butt or head, and in general 9 in. square at the tip end. Of the 48 piles which were driven, 6 were 8 in. square and 6 were 10 in. square, instead of 9 in. square at the tip; the object of this variation in size of the tip being to determine which size gives the best results. Averages of the time actually driving the piles indicated that the 8-in. tip is slightly preferable in time driving.

The piles were reinforced with four ⅞-in. corrugated steel rods extending to within 2 in. of the ends of the pile, and embedded 2 in. from the face near the butt and 1½ in. from the face at the tip. Loops of ¼-in. corrugated bars were placed around this principal steel spaced about 12 in. on centers, except near the butt, where the spacing was decreased to 4 in., there being 34 loops in all. The butts of the piles had also extra reinforcing, some with ⅜-in. and some with ½-in. rods, varying in length from 2 to 3 ft. Near the top of the pile a ⅞-in. rod about 5 ft. long was embedded in the concrete with a loop sticking out on one side for hooking with chain. A galvanized iron pipe running through the center of the pile, was connected near the butt by a nipple with an elbow and an iron pipe for the introduction of the water.

For the purpose of experiment the size of the pipes in the piles varied, so as to include 2, 1½, 1¼ and 1 in. pipe. The results indicate that a pile with a 1-in. pipe takes slightly longer to drive than a pile with larger sized pipes. The friction of water running through pipe of small size is very great, so that it is known without experimenting that the largest size pipe which it is practicable to insert in a pile will give the least loss of head and, therefore, be the best. To increase the velocity of the water, and thus increase its power to loosen earth (note that it is the velocity, not the pressure, which is increased), the size of the tube should be reduced near the tip, the reduction being made far enough from the tip of the pile to prevent clogging under heavy blows. There is no danger of the nozzle filling while the water is flowing freely, and, therefore, no danger while the pile is being churned down in the first few blows. This difficulty is apt to occur, however, when the driving becomes hard, but at this time the penetration per blow is so small that it would seem that a nozzle 12 in. long should be sufficient to prevent any material working up into the larger pipe.

Fig. 1.—Concrete Piles Hooked and Being Pulled from the Platform.

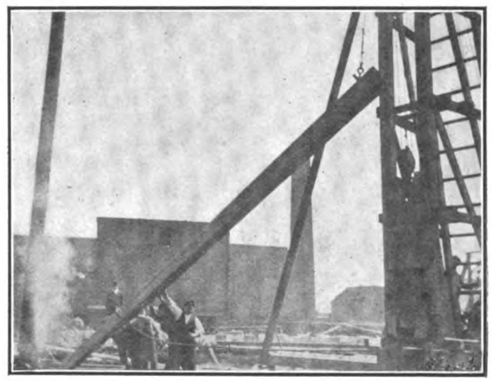


Fig. 2.—Pile Being Pulled Into Place, the Hammer Being Down to Steady Machine.

Cast Reinforced Concrete Piles.

The concrete was mixed by hand in the proportions of 1:2:4, using ¾-in. trap rock. The sand and cement were first made into a mortar and then the stone was added. A thorough mix is of course essential. The mixing was started in March, precautions being taken at night against possible frost, and the piles wetted down every day for two weeks.

A piece of level ground next to the site of the new building and of sufficient area to hold all the piles was covered with a 2-in. rough plank platform on which chalk lines were struck, and V-strips to form a 1-in. chamfer on the corner of each pile nailed so as to bring the piles about 6 in. apart, and alternating points and butts. The casting of the piles with alternating points and butts economizes space, but if space is not a consideration and the piles are to be handled directly by the pile driver without any intermediate handling, it is best to cast them all with the butt end toward the machine. The

* From a paper read before the Boston Society of Civil Engineers by Sanford E. Thompson, consulting engineer, Newton Highlands, Mass., and Benjamin Fox, contractor, Boston, Mass.

side of each pile mold consisted of two 8-in. rough plank, undressed lumber being used to increase the skin friction. The outside form was cleated with 2 x 4s, and the other planks forming the sides of the intermediate piles were simply set on edge against the V-strips and held in place by seven pair of wedges and seven pieces of 2 x 4s nailed across the top of each set of pile forms. V-strips nailed onto the plank sides located the upper surface of each pile and formed a chamfer.

The steel reinforcement was wired together on a separate platform and frame built for the purpose, No. 14 annealed wire being used for this. The reinforcement was suspended in the form by two wires attached to each of the 2 x 4 pieces, and then the iron jetting pipe was inserted and wired to the longitudinal rods.

The gang making piles consisted of one foreman, a labor foreman at 25 cents per hour, four laborers wheeling and mixing concrete at 25 cents an hour, one labor

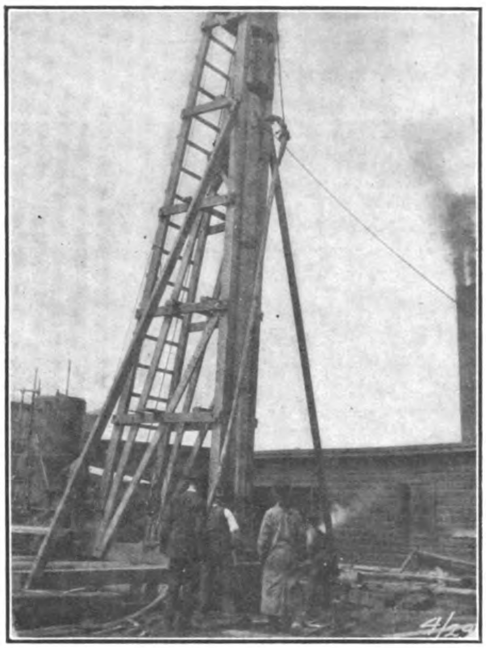


Fig. 3.—The Pile in Position and the Machine Ready to Begin Driving.

Cast Reinforced Concrete Piles.

subforeman ramming, four carpenters at 43¾ cents per hour, and four steel men at 35 cents.

It took a gang of four carpenters 15 hr. to set up the sides of five piles (10 sides), and the total time required to take down the sides of these piles was 2 hr.

The age of the piles when driven ranged from 30 to 41 days, the larger part of them being about 30 days old. It may be safely stated that a period of one month for seasoning piles is ordinarily sufficient during, say, the months between May 1 and October 1, but during the colder months a longer period should be allowed unless artificial heat can be used to hasten hardening.

A very heavy pile driving machine was used on this work because of the side strains brought to bear on the machine by the dragging of the piles from the casting platform, and also to resist the shock of the 4700-lb. hammer which was employed. To avoid fracturing the pile from blows of the hammer, a specially designed cushion head was arranged. A single compound piston pump having a capacity of 100 gal. per minute furnished the water for jetting through a 2½-in. hose. The highest pressure obtained was 125 lb., but this was variable and uncertain and consequently very unsatisfactory. With a good and steady water pressure at hand the number of piles driven per day would have been materially increased.

The usual process of driving the piles consisted in hooking and dragging the pile, lifting it to place in the gins and attaching the hose, all as shown in Figs. 1, 2 and 3. To facilitate setting the pile into the gins a crutch made of 1-in. iron with a 12 x 12 in. square key at one end took the place of the peevy or cant dog used with wood piles. As soon as the pile was in place and the hose attached, the water was turned on, and the pile usually penetrated for a short distance without the hammer. The hammer was then placed upon the cushion, and the pile sank for another distance, varying in accordance with the nature of the fill. Next the hammer was attached to the pile with a chain and the churning commenced. There was enough play in the chain connection between the hammer and the pile to give about a 10-in. blow of the hammer each time the pile was lifted. When this lifting became ineffective the chain was disengaged and the pile driven with blows in the usual manner.

The object of the water jet is to loosen the material ahead of the pile and wash it away. The water generally follows up the side of the pile bringing up with it the sand or other material through which the pile is being driven. As an old wharf formerly occupied this site, a lot of old timbers in all stages of decay were encountered in several places, the presence of which was evident by the pile refusing to go down. As the water washed the material from under and around it, the corner or end of the timber in some cases was apparently broken off and the pile would drop considerably. In several instances this was proven to be the case, for after the above occurrence a broken piece of old timber would be washed up with the sand and gravel.

The gang driving piles consisted of one foreman at $0.50 per hour, one engine man at $0.50 per hour, one pump man at $0.25 per hour and seven laborers at $2.50 per 8 hr. The total cost per gang per 8 hr. was $27.50.

In addition to this gang, two carpenters were called in occasionally for repairs, and two other laborers were busy most of the time in connection with cutting off piles, digging holes and odd work.

Time and cost as ordinarily applied are of comparatively little value for estimating the cost on subsequent jobs, and this is especially true upon work of an untried character, where, moreover, the records are of greatest interest. It frequently happens that even some of the most important factors in fixing the cost are omitted. In one case, for example, an elaborate tabulation of costs was made upon the construction of a storage reservoir, but the length of the haul, the hight of the bank, the character of the earth excavated and the rates per day paid to the men were not given. In other words, the data although representing a large amount of clerical labor were absolutely useless except for a job identical with the one upon which the records were taken, and a job identical with this was an impossibility because the conditions mentioned would all differ to an appreciable extent on any two pieces of work.

On another large piece of construction carried on by a branch of the United States Government the monthly records were carefully kept and the costs per cubic yard figured out, but when supplies were purchased they were all charged on the date they were received, so that if, for example, the cement for 10,000 yd. of concrete was received during a certain month its cost would be divided into the cost per cubic yard of the concrete laid during that month, even although two-thirds of the cement was in storage for future use. Consequently, the unit price during one month might be double that for the next, with the conditions substantially identical.

Even when the fundamental data are given in thorough detail the times and costs are apt to be applicable only to another piece of work which is quite similar in character, not necessarily from carelessness, but because of the difficulty and the time required in separating and properly analyzing the different operations.

Some of the difficulties met with in such records are:

1. Distinguishing between the times which are constant for any job and those which vary with the quantity of the work.

2. Separating items which may be abnormally large or abnormally small on the job in question, so that allowance may be made for these particular items in future estimates.

3. Omitting to separate the time necessarily wasted because of abnormal conditions or because the work is of a new and untried character.

To prevent such differences as these and to avoid the errors resulting from them, the writer, under whose supervision the recorded notes were taken, has used for a number of years the plan originated by Fred. W. Taylor in machine shop work of finding the elementary unit times on any piece of work in sufficient detail so that these unit times may be recombined in any desired arrangement. This enables the constants to be distinguished from the variables, abnormal times corrected, and lost time which will not occur on another job eliminated. Allowance can also be readily made for the time which is always necessarily lost during rests and ordinary delays.

To make such studies as these it was found necessary in many cases to record very small times, fractions of a minute, and as an ordinary time piece or even the common form of stop-watch is very cumbersome, a watch with a decimal dial was designed on which the minutes are divided into hundredths instead of into seconds. With this the time is all recorded in minutes and decimals of a minute instead of in hours, minutes and seconds. Thus any of the times may be added together directly or multiplied. For holding the watches and the loose note sheets a case in the form of a book was also designed.

These remarks are somewhat aside from the subject under consideration, but may be of interest as showing the methods which have been adopted in certain cases for analyzing the times and costs of work of a decidedly intricate character.

In the pile driving at the Boston Woven Hose & Rubber Company, a complete analysis was made only upon the driving of the piles, no detail times being taken upon the making of the piles and items incidental to this. However, the costs of all of the individual items were recorded carefully by the contractor, Mr. Fox, and are therefore sufficiently minute to form a basis for estimating other jobs which differ in detail.

The operations of driving a cast reinforced concrete pile are similar in a general way to those involved in driving wooden piles, but the operation, or in many cases the lack of operation of the water jet, and the somewhat greater care which must be used in handling the piles, considerably increase the labor, and particularly increase the amount of work getting ready to drive and the necessary delays incidental to the driving.

In order to correctly analyze such work as this and separate it into small enough operations to permit the adaptation of the times and costs to other jobs, very minute and exact records are necessary.

The records were taken by the writer's principal assistant, William O. Lichtner, with the aid of the decimal watches and the watch book already referred to. When the pile drivers were about to start a new pile, each individual operation, such as moving pile driver, attaching rope to pile, pulling pile, raising pile vertically, and so on, was entered on the note sheet. In many cases each one of these operations became separated into two or three parts by delays or additional operations occurring in the midst of them, and these delays were also recorded with the time.

(To be continued.)

THE APPRENTICESHIP SYSTEM AND THE TRADE SCHOOL.

THERE has recently been prepared for the Federal Bureau of Education a study of the apprenticeship system in its relation to industrial education, the author being Carroll D. Wright, president of Clark College. Education by apprenticeship and education by schools has gone on for many generations side by side as two entirely distinct relative forms of education, and the new movements are concerned with bringing these two kinds of education together and making for them a new kind of education which shall train equally for skill and for intelligence. The substance of Mr. Wright's argument and findings is covered in what follows:

There are three methods of securing greater skill for our industries. First, the apprentice system; second, trade schools; third, industrial schools. The old system of indenturing young men for industrial purposes was greatly modified by the introduction of labor saving devices and the industrial revolution of the nineteenth century. As, however, the need of skilled workmen still exists and the present system of trade and industrial schools has not proved altogether satisfactory in turning out practical, as well as theoretical workmen, some co-ordination is needed whereby the good of the apprentice system and the modern trade and industrial schools may be combined.

Trade schools have proved themselves inadequate, nevertheless, their power and influence must be recognized. The best equipped public industrial schools, however, have all the machinery and appliances for the instruction of students. In industrial schools as distinguished from trade schools the academic work is the more valuable because allied to industrial training.

Apprenticeship Still Exists.

Contrary to popular belief, the old system of apprenticeship now exists to a large degree in the United States, but is very quietly and rapidly giving way to the modern. This system varies with localities, but investigation has developed the fact that the apprenticeship system is a power to be reckoned with and that it exists in all parts of the Union.

All but three of our States have enacted statutory regulations relating to the employment of apprentices, while the laws of 38 States provide that in addition to the trade, the apprentices must be taught the common English branches of education and receive such schooling as every youth entering business should have.

Trade unions are as a rule opposed to trade schools, principally in apprehension that in strikes the apprentices might be employed as strike breakers. This prejudice is not deep-seated, however, as shown by the resolutions adopted by the 1907 annual convention of the American Federation of Labor. Everywhere it is beginning to be understood that industrial education does not injure those already engaged in industry and the antagonism is disappearing. Where union regulations relative to the employment of apprentices do exist, they are often disregarded wholly or in part by both unionists and their employers, both of whom must realize that the effectual expansion of the system with an increase of skill and consequently of wages, must prove to their mutual advantage.

Necessity of Trained Labor.

The proprietors of industrial establishments at the present time are not blind to the necessity of training labor in their own works. There is hardly a manufacturing firm to-day, especially in the jewelry and shipbuilding trades, which does not have some form of apprenticeship whereby boys are indentured for a term of years to the trade. The point of consideration is to what extent do these systems meet the arguments advanced for the introduction of industrial education as a part of the public school system. All employers realize the value of such education and those who can afford it, prefer it to their own system. A careful investigation, however, shows a wide variance in their procedures. Some have no system, while the majority have a system of indenture for a term of years and a few have an elaborate scheme of training, comparing favorably with the best public training that can be offered.

Careful selection of boys fitted for the particular work is the first step. They must pass also a physical, mental and moral examination. Their rate of pay is determined beforehand and increased now and then for encouragement. The kind of work the boys do is varied, and their future is considered as well as the profits to be derived from their service. In brief, it is a shop course of study, much as any industrial school might be expected to have. Academic work to supplement the work in the shop is arranged for by nearly all the best concerns, generally imparted by one of the engineering staff. In the case of advanced apprenticeships the boys are paid for their time. This is an essential feature of the modern apprenticeship system. The boys are encouraged to attend evening classes or take correspondence lessons, but investigation shows that this encouragement lacks definite results. The cause of this is the lack of interest shown by employers in following up the results of this encouragement, and in this respect the apprentice system, as now carried on, differs materially from the work done in the regular industrial schools.

An Incomplete System.

Up to this point the argument has concerned itself with two phases of the apprentice system—one a definite and complete system, which may or may not be substituted for a trade school; the other an indefinite and incomplete system, which lacks the fulfilling of a mutual obligation, which is very essential to a properly constructed apprenticeship course. Another type of apprenticeship now in existence is where the lad is indentured to one department only, there to specialize. This plan is popular because it enables the boy to receive higher wages and the employer to get more efficiency in a comparatively short time. As a rule, however, specialization limits the capacity and narrows the mind. It is right as it secures special skill, but there should be something more in order to train the all-round man.

The demand for trade schools comes from employers who have no systematic, definite method of training their apprentices. Those superintendents of industrial organizations who have this advanced type of apprenticeship, combining shop and academic training, do not feel that the local schools will meet the demand of their factories. This feeling exists very strongly among the managers of the various railroads which have adopted an apprentice system.

Portable Houses in Central America.

Consul Drew Linard writes from Ceiba that the time and opportunity is ripe for manufacturers of the portable cottages that are so extensively used in the United States for camps, resorts and on construction works to advertise and push their products in Honduras. The consul gives the following practical trade pointers:

Prior to the recent activity in building construction here 90 per cent. of the homes were one or two room adobe or pine shacks with thatched roofs. The demand for a better class of dwelling is becoming more general. The large profits realized by the small banana grower enables him to improve the comforts and appearance of his home.

A very plain one-story, four-room house, with kitchen attached, has been adopted as the popular style of architecture. These houses, which cost about $1500 United States currency to construct, are roofed with heat-absorbing corrugated galvanized iron sheets, have a porch along the entire frontage, and windows without glass, a large wooden shutter answering the purpose. The interior is unsheathed, all joists showing, and the room divisions are of lapped boards. Owing to faulty construction and poor material few of the recently constructed houses here are impervious to the frequent torrential rains in this region.

The cost and addition of acetylene gas and water tank is optional with the tenant and depends upon his purse and disposition as to these luxuries.

The culled white pine known to the trade as "seconds" is the only kind of lumber used in the construction of these houses, and costs 90 soles (about $45 gold) per 1000 ft. B. M., the climate limiting its period of usefulness to three years, more or less. The carpenters receive 6 soles a day of 9 hr. They are, as mechanics, slow in execution and primitive in ideas.

A four-room portable house, with porch and kitchen attached, could be delivered and erected here at a lower cost than for a building erected by the prevailing method of construction, and would be much more attractive architecturally, more durable, and give greater comfort and satisfaction to the owners.

Pebble Ceramic Mosaics.

By Charles J. Fox.

In the usual mosaic work on floors or pavements, the more or less regular lines of the jointing are one of its characteristic features, even when the individual tesseræ are in the form of circles. In ceramic mosaic, the jointing is more regular than in marble, because the tesseræ of the former are molded in steel dies, while those of the latter are cut by hand from strips of sawed marble; but in each case the regularity of the joints is noticeable. In art or cut ceramics, the individual pieces composing the pictures or design are cut by hand in almost every desired shape, and the regularity of joint lines is not present.

As a general statement it may be said that pictures, even when executed in the most durable ceramic mosaics, are not appropriate ornaments for floors or pavements; for the simple reason that pictures are a work of art and are to be looked at and admired rather than walked upon. Pavement decorations in various designs executed in different colors make an appropriate floor covering; but there is something unnatural and false in a scheme of decoration, which causes one to walk upon animate objects, landscapes or similar objects that are reproduced in the form of pictures. In addition to these objections to the mosaic tableau as a pavement decoration may be added the practical one of the expense of covering large floor areas which are the parts of the building that are subjected to the greatest abuse, with elaborate and detailed mosaic work.

Until the invention of pebble ceramic, the only mosaic floor in which regular jointing was absent was the so called terrazzo, which is made by sprinkling marble chips upon a cement foundation before it is set. Although they form a pleasing variety of mosaic work, the terrazzo floors have two serious drawbacks. The marble chips are soft and have not the same wearing qualities as the cement which surrounds them and which forms anywhere from 25 to 40 per cent. of the surface area. As these chips wear down or work out the floor acquires a pitted and worm eaten appearance. Furthermore, the lime which has to be added to the cement foundation of the terrazzo floor causes it to shrink and crack in setting, all of which of course is objectionable, but not so much so as to prevent a great deal of it being done.

The same effect, due to the lack of regularity in the jointing of the terrazzo floor, can now be produced in the pebble ceramic mosaic. The pebble ceramic represents a cross section of a water worn pebble. The tesseræ are manufactured in numerous colors—white, red, dark green, buff and others—and in so many different shapes and sizes that they average about 75 to a square foot. In this manner all straight lines are avoided. The ceramic tesseræ come pasted on paper and are set exactly in the same manner as the ordinary variety. No lime has to be added to the mortar, and as the individual pieces are made of hard baked clay about ¼ of an inch thick, they should, under ordinary circumstances, never wear out or work loose.

A most artistic floor is obtained by the use of a pebble ceramic mosaic body surrounded by a border of square ceramics. Such a floor is especially appropriate in long and narrow corridors. It has all the lasting qualities of the ordinary ceramic floor, about the only difference being that the cement surface of the irregular jointing takes up a somewhat larger proportion of the floor area.

SOME INTRICATE PROBLEMS IN FRAMING.—II.

BY C. J. McCARTHY.

WE will now proceed to show the manner of drawing the side arches and groin arches in a Gothic vault where the side arches are the same hight as the arch of the body range. Referring to Fig. 5 of the drawings, let A B of No. 1 be the center of the body range; E D C the given arch; F G H and K L M the side arches of different spans, but of the same hight; O Q the seat of the smaller and S U the seat of the larger groin. Divide the arch C D as before into any number of equal parts, through which draw lines parallel to the axis of the body range A B. From the points of intersection *e, f, g, h*, with the seats of the groins O Q and S U, raise perpendiculars to these lines, shown at *e* 1, *f* 2, *g* 3, &c. From the same points draw lines *e a* 1, *f b* 2, *g c* 3, &c., perpendicular to the chords of the arches F I H and K N M. From the points *e, f, g, h* and *a, b, c, d*, set off the lengths of the ordinates of the given arch, where curves drawn through the points thus found will give the profiles of the arches required.

In No. 2 of Fig. 5 is shown a vertical section through the axis of the body range clearly indicating the timbering of the vaults. On the underside of the plan No. 1 is shown the method of laying out the diagonal rib.

We will next consider the arch of the body range of a groined vault with the imposts on an inclined line and show the manner of finding the side and groin arches. Let A B C at the left in Fig. 6 represent the arch of the body range; I L K the seat of the groin and E H G the inclination of the imposts, making the angle G E *o* with the horizon. Proceed by dividing the arc A B C into equal parts, 1, 2, 3, 4, drawing ordinates from them as before, meeting the seat of the groin in the points *e, f, g, h*, L. From these points draw the lines *e a* 1, *f b* 2, *g c* 3, &c., perpendicular to the line *a o* and set up, from the points *a, b, c, d* and H where they intersect the raking line E G, ordinates *a* 1, *b* 2, *c* 3, &c., corresponding to those in the arch of the body range; then through the points thus found trace the curve of the arch E F G.

To find the curve of the groin draw K N perpendicular to I K and equal to *o* G, expressing the rake or inclination of the groin. Join I N and draw the lines *e i* 1, *f k* 2, *g l* 3, &c., perpendicular to I K, and upon them set off from the points *i, k, l, m* on the line I N the hights 1, 2, 3, 4, &c., of the ordinates of the arch A B C of the body range.

At the right hand side of the diagram, Fig. 6, is shown the manner of finding the curve of the groin arch when the highest point of the side arch is not in the center of its width, as at U V D. Divide the arch of the body range Q R S into equal parts, as 1, 2, 3, &c., and through the points of division draw lines parallel to Q S to meet the line P *s*, which forms a right angle with P Q. With the concentric dotted quadrants carry the points in P *s* round to meet P *t* or P Q, produced, and from the points therein draw lines parallel to the rake. Bisect E D in X and square up the line X V. From X as a center and with radius X E or X D describe the semicircle U V W and draw E U, the line of the pier produced.

From the points of intersection of the raking parallels with the semicircle draw lines parallel to Q S through the plan of the groin, and intersect these by lines drawn through the points of the body rib Q R S parallel to the axis of the body range Z R. Through the points of intersection trace the curved line *e f g h* Z to the point Y which is the seat of the groin.

To find the curve of the groin ribs draw through the center X the line U W parallel to the axis of the body range, and through *p* where the line V Z drawn from the summit V cuts the raking line E D, draw *p r* parallel to U W. Through E draw also E *o* parallel to U W; then on the plan join Y Z and Z Y′, which are chords to the intersecting lines. Draw the other two lines parallel to them, touching the outside curve and meeting at *n*. The distance between them will give the thickness of the stuff required for the intersecting rib. Through the points of the intersecting parallels, that is, through the

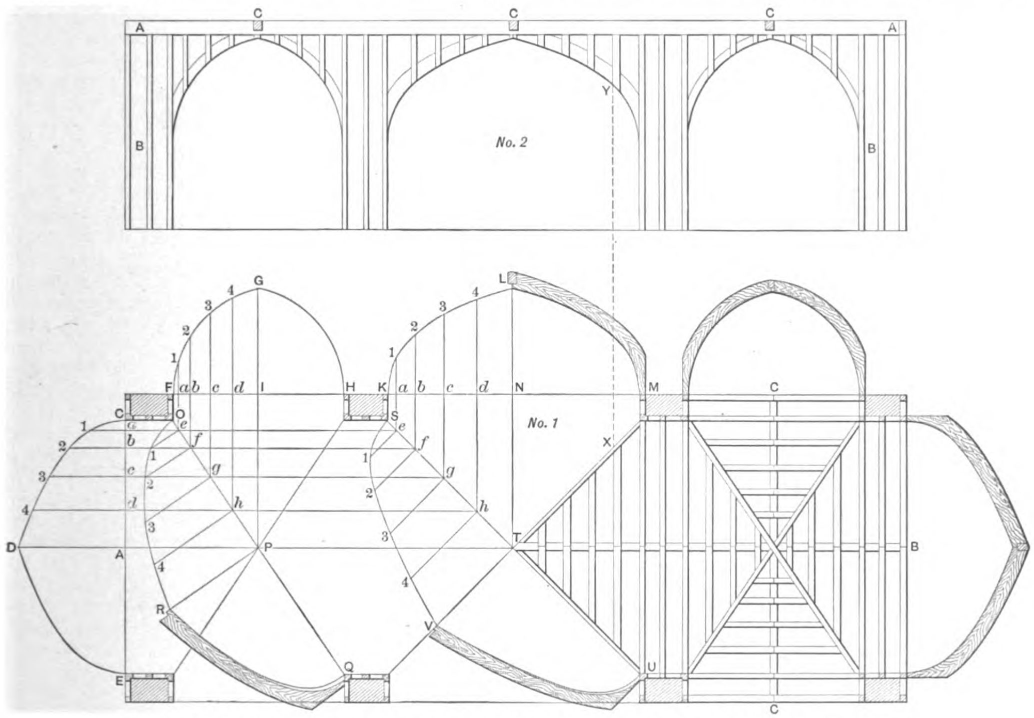


Fig. 5.—A Groined Vault with Side Arches the Same Hight as Body Range but of Different Widths.

Some Intricate Problems in Framing.—II.

points on the seat of the groin *e, f, g, h,* &c., corresponding to the points 1, 2, 3, 4, &c., on the body and side ribs, draw indefinite lines perpendicular to Y Z and Z Y'. At Z set up the hight Z *k* corresponding to the hight *o p* of the side rib and join Y' *k*. Now at Y set up the hight *r* D of the side rib and draw the raking line Z *q*, &c.; then the hights on each side of the side rib *a* 1, *b* 2, *c* 3, *d* 4 and *p v* set up on the lines below at *i* 1, *k* 2, *l* 3, *m* 4 and Z A, will give the curve of the groin rib.

A Welsh groin is one in which the side arches are lower than the arch of the body range, the manner of laying out the intersecting ribs, &c., being shown in Fig. 7 of the diagrams. Referring to the diagram, let A B C represent the body rib and T F G the side rib. Then to find the intersecting ribs divide half the rib E F into any number of equal parts as 1, 2, 3, F and from these points let fall perpendiculars 1 *c*, 2 *d*, 3 *e*, F *f*, and produce them indefinitely. From the same points 1, 2, 3 and F, draw lines parallel to G E, intersecting *l n*, which is a prolongation of the springing line A C of the body rib. From L as center draw the quadrants carrying the divisions of *l n* around to *l m*, which is a continuation of the springing line E G of the side arch; then from the divisions thus formed on *l m*, draw lines parallel to A C, intersecting the body rib A B in the points 1, 2, 3 and *a*. From these points draw perpendiculars to A C through *c, d, e, f*, and produce them until they intersect the perpendiculars drawn from the corresponding divisions of the side rib at *g, h, i* and I. Then a curve traced through the intersections will be the place or seat of the intersecting rib upon the plan.

Upon one side of the curve draw two chords as H I and K I. Draw also two other lines parallel to these and touching the outside of the curve and the distance between these lines will show the thickness of the stuff required for the intersecting rib, the timber on each side of the curved line being beveled away to fit the surfaces of the two vaults.

To find the vertical curve of the ribs proceed as follows: Through the intersecting points *g, h, i*, I draw perpendiculars to the chords H I and I K; make the hights *c* 1, *d* 2, *e* 3, and I L measured from the chord line, equal to the corresponding hights *c* 1, *d* 2, *e* 3, *f* F, measured from the line T G to the curve of the side rib; when a curve drawn through H 1 2 3 L will be the mold of the intersecting rib.

In order to find the covering of the vault E H I K G draw the line A B of Fig. 8 and set off the divisions 1, 2, 3, 4 corresponding to 1, 2, 3, F on the under side of the side rib T F G. Draw the perpendiculars A *c*, 1 *d*, 2 *e*, 3 *f*, 4 *g*, &c., making them equal, respectively, to E H, *c g*, *d h*, *e i* and *f l* I of Fig. 7. Then A *c d e g f* 4 will be half the covering required.

On the lower side of Fig. 7, we show a Gothic side arch, the method of procedure being precisely the same as for the semicircular arch. The side arch P R is divided into equal parts, as shown by 1, 2, 3, R. These divisions are transferred to the body rib C B, as before, and the intersections of the perpendiculars from the two arches in *g, h, i*, N give the points through which the curve of the intersecting rib is drawn. The seat of the intersection may be made a straight line by reversing the operation, thus: Draw the center line of the side range R N and intersect it by the line *b* N from the body rib B C; and join M N, and draw upon it from the points of intersections of the divisions of the body rib, the perpendiculars *g* 1 *h* 2, *i* 3 and N O; set up on these lines the hights corresponding to the same points in the body rib to find the curve of the intersecting rib and set up the same hights on the perpendiculars drawn on P *k*, for the curve of the side rib.

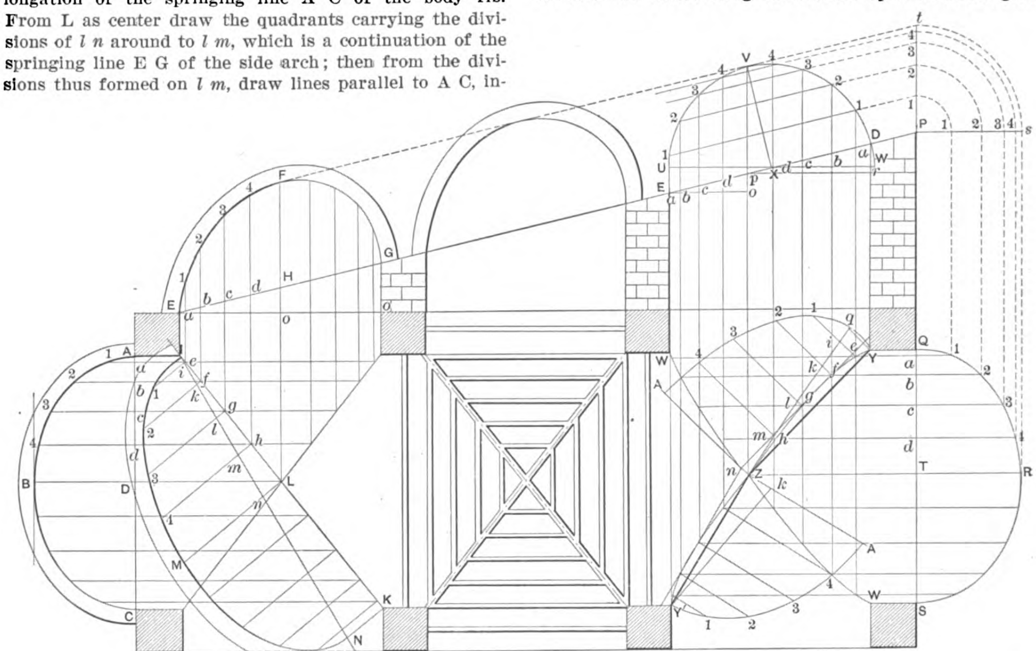


Fig. 6.—A Groined Vault with Imposts on an Incline.

Some Intricate Problems in Framing.—II.

In the other parts of Fig. 7 is shown at S the side range running at an oblique angle to the body range and at T the side range is curved in plan. The center from which the sides of the side vault are described is to be found on the line of the face of the piers or side of the body range extended.

The curves of the side ribs in each case are set up at *o p r* and divided into equal parts, from which ordinates are drawn to intersect the line *o r*. Through these points of intersection lines drawn parallel to the sides of the vault—straight in one case and curved in the other—to meet the lines from the division of the body rib, will give the places or seats of the intersecting ribs. The vertical curves are found in precisely the same manner as described in the foregoing examples. The remainder of the figure shows at U and V the manner of timbering the opposite vaults.

A GOOD method to cure leaky shingles is to take an old can or any kind of scrap tin and cut it in strips 2 in. wide and 6 in. long, and if not straight, hammer them so. Slip these pieces of tin under the split in the shingle and it is said that it will save a roof from two to four years from leaking. When a roof is patched by driving in new shingles it raises the other shingles up and frequently causes leaks of a more serious nature.

Machinery for the Small Woodworking Shop

There is probably nothing in the way of mechanics or machinery that has opened the way to more possibilities and opportunities for the village carpenter than the gasoline engine, says J. Crow Taylor, in an exchange. It is the small power unit the village carpenter has been wanting right along, something small and inexpensive that would serve to drive a turning lathe, rip saw, scroll saw or other similar machines with light power requirement. In times

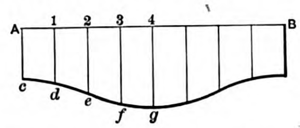


Fig. 8.—Pattern for Covering of Sectroid.

sive line of cabinet woodwork, the manufacture of wood novelties and almost an endless line of work, depending much on the ingenuity and enterprise of the man himself, and the prosperity and taste of the community. In fact, the field of opportunities that opens up is so great that apparently no enterprising village carpenter should be without one of these small gasoline engines in his shop, and their usefulness is not by any means confined to the village carpenter either, for even the city carpenter can find a remarkable amount of work that can be done to advantage in the shop if he has a little power and a few light machines. But the gasoline engine does not as a rule appeal to the city carpenter as much as to his brother in the country villages from the fact that should a city carpenter want power at any time, all he has to do is to put in a little electric motor and he can use power from one of the local power companies and pay them according to the amount used. This as a rule is a little more expensive than the use of the gasoline engine, but it has certain other advantages to commend it in the city.

But, to go back to the general idea of a carpenter

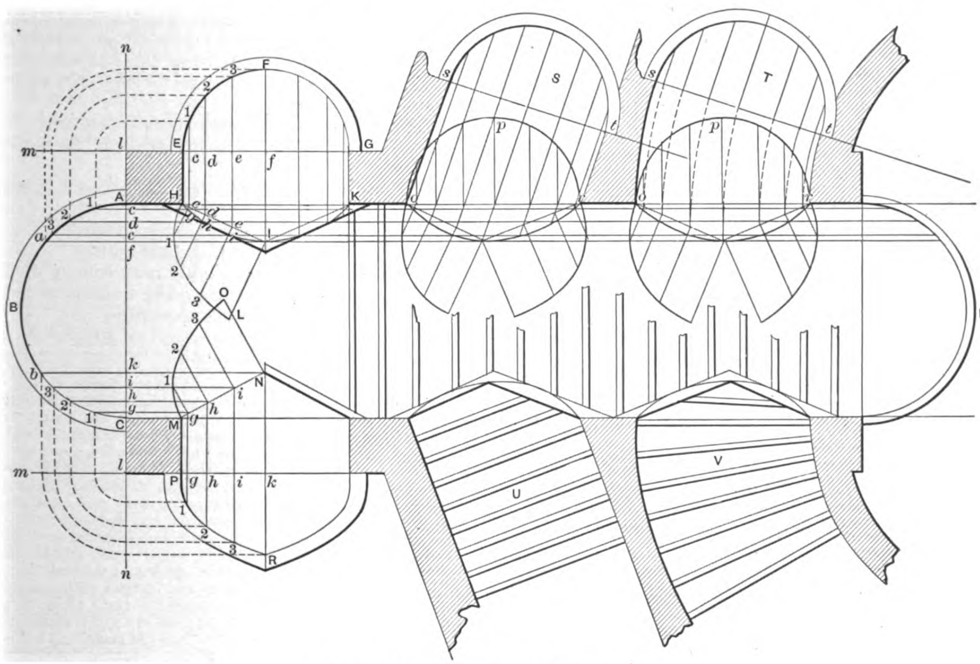


Fig. 7.—Four Examples of Welsh Groining.

Some Intricate Problems in Framing.—II.

past many have resorted to hand and foot power for the operation of certain light machines of this kind, but now there is no longer any need of this, for the gasoline engine can be had of almost any size from 1 hp. and even ½ hp. up to 50 hp. The question is open for argument as to whether or not it is advisable to use the gasoline when 10 hp. or more is wanted, and the deciding factor depends largely on local conditions, but what the average carpenter wants is a little 3-hp. or 4-hp. engine, and it is remarkable what an aid to business this kind of an engine is. It not only furnishes driving power, and thereby the means for doing certain kinds of special machine woodworking called for at various times in the life of every carpenter, which would either have to be ordered by local freight from some city, or else laboriously made by hand, but it goes further than this; it makes a carpenter shop a sort of local factory, a place where during bad weather and through the winter when building operations are at a standstill, the village carpenter can turn out a remarkably wide range of woodwork that he will likely need for the busy spring season. The opportunities do not stop here either, but the institution may be expanded into the doing of quite an exten-

doing machine woodworking. One can get small gasoline engines for a modest sum which will generally give fair satisfaction and call for very little attention. These little engines have really made the greatest opening that has ever been before the average country carpenter, and the man who expects to continue in the carpenter business is standing in his own light if he does not equip his shop with one, for it is only a matter of time when some one else will if he does not, and then he will begin to lose work, and prestige, too. It furnishes an opportunity to make the carpenter business not merely of a short season, but one at which a man can be profitably employed at all the year round, for when he is not busy outside he can be doing things in the shop. The idea is an inspiring one, too, and once you let it take a good hold on you it will require some effort, some curbing, to keep it from running away with you. That is the one thing you should keep in mind all the time, and guard against. If you invent a new wooden novelty and think there is money in it, enough to equip a factory and make it for general distribution all right, make sure your figures are right, and then go after it, but don't, whatever you do, allow the idea to run away with you to the extent of manufacturing general woodwork in competition with larger mills and factories, for nine times out of ten you will land into trouble, and the tenth time you will likely get into the habit of neglecting your carpenter business, so there is not much chance for you to win in a game of that kind. Still, with the brakes properly applied against this danger, there is no cause whatever to curb enthusiasm, and the more we have of it the better, not only for the carpenter trade, but for the country in general, because it means the adding of more architectural beauty to country houses and the adding of more profits to the village carpenter.

Ordinarily, if I should start out to fit up a carpenter shop in a country town with a small power and some woodworking machines, I would say the power equipment should be about 3 hp. or 4 hp. gasoline engine, a rip saw, a small band or scroll saw, a turning lathe, a small planer, either a top smoother or some light panel planer, and then I would stop. In fact, I might even stop at first with getting a small rip saw, a lathe and a light scroll saw. However, as I have said before, much depends on local conditions. And this applies not only to local conditions in the way of requirements, but also to supplies. If there should be a regular planing mill in town, I would omit the planer part entirely. But generally where there is no planing mill the village carpenter can save an enormous amount of hand planing by having either a top smoother or a panel planer. The lathe you can hardly omit under any conditions, for there is a chance to utilize almost anything in the shape of waste in the turning lathe, and especially between a turning lathe and scroll saw. You can turn corner blocks out of scraps; you can also turn an almost endless variety of special decorative woodwork, to say nothing of the various wood novelties in the way of kitchen utensils that may be made out of these same scraps during the dull winter season, or when a rainy day comes and you can't work outside.

Saw Table as a Woodworking Machine.

It is a peculiar fact, though, that for the simplicity and generally innocent looks of the machine you can get more out of a common table saw than out of almost any other woodworking machine. There are, I know, certain combination machines made, such as a top smoother, which is combined with a saw and boring machine, and 47 different combinations of these machines by which you can make almost anything in the line of woodworking, and there is no question but what, in many instances, a machine of this kind is worth having in such a shop; in fact, would be a good investment. But there are some of these plain, wooden top table saws that don't look like more than 1s. 6d., and don't cost more than about £5, that can be made to do lots of work in the hands of a man who knows how to take advantage of their curves. In the first place, a rip saw is one of the most convenient things in the world, because there is really more ripping, if we include the sizing of various parts, than anything else, especially where a carpenter uses rough framing. Then, by changing saws, you can convert this rip saw into a crosscut, and by adjusting the extension of this saw up through the table you can perform quite a lot of work that you generally have to take a hand saw to. You can cut in gains, tenon shoulders, laps and all sorts of things of that kind. And, by putting on a bunch of saws or a dado head you can cut out the gains, rabbet, and do various other things. You can, too, by putting on a saw of a thickness and getting it the right cut, rig your slide gauges up and do a very respectable job of grooving flooring, and then turn around, put on two saws, and make a tongue on the other side match the groove. You can put a slide form on for cutting shapes, cut the ends of rafters, cut miters, cut joist bridging, make wedges. In fact, there is hardly any limit to the possibilities of a rip saw table when it is in the hands of a man of ingenuity, especially if he will go to the small expense of providing a variety of saws and cutters to be used on the mandrils. You can even get a small planer head, with bits, and turn it into a top smoother or jointer.

The one thing the average carpenter must guard against in taking up the idea of the small gasoline engine for operating a few woodworking machines is the tendency to go too far with this matter. It is, of course, a little difficult to point out clearly just where the line should be drawn and the distinction made between a carpenter shop and a planing mill. Quite a lot naturally depends on local conditions and each man must figure out for himself how much power he ought to have and about how many different machines he can operate to advantage.

Association of Masters and Craftsmen of the Building Trades of the District of Columbia.

A new organization composed of master builders, contractors and employees in these trades has recently been incorporated in the city of Washington under the title of "Association of Masters and Craftsmen of the Building Trades of the District of Columbia." The organization is the outcome of the recent open shop battle between employers and organized labor which continued for nearly two years. The details of the association, which embraces in its membership both employer and employee, were worked out after much thought and effort by William E. Speir, formerly president of the Speir Company, building contractors. At the first meeting, which was attended by 150 men, a constitution and statement of objects and principles were adopted and 100 of those present signed the roll of membership. Officers for the ensuing year were elected as follows:

President, Joseph Richardson, master builder.

First Vice-President, Joseph Annand, journeyman bricklayer.

Second Vice-President, William Humphreys, journeyman carpenter.

Treasurer, Thomas Hughes, master bricklayer.

Secretary, William E. Speir, master builder.

The above officers and six other men, equally divided between masters and craftsmen, every trade to be represented, will form the Executive Committee.

The objects of the organization as adopted at the initial meeting are stated as follows:

To bring into closer and more friendly intercourse the employer and employee engaged in the building industry; to reform abuses and secure freedom from unjust and unlawful exactions; to promote the interests of its members; to foster the highest standard of workmanship and the highest possible wage merited by skill and proficiency; to adopt ways and means of peacefully adjusting and settling all controversies, difficulties, misunderstandings and grievances; to procure harmony and certainty in the relations existing between employer and employee; the test for membership shall be the skill, character, standing and ability of the applicant; to adopt ways and means to aid and assist its members in case of accident, sickness or death; to establish free, independent open shop principles in the District of Columbia as a permanent condition; to acknowledge the right of every man to be free and independent, and denying the right of any individual, organization or union to infringe the same.

We declare and affirm that absolute personal independence of the individual to work or not to work, to employ or not to employ, is a fundamental principle which should not be questioned or assailed: that upon it depends the security of our whole social fabric and business prosperity, and that employer and employee should be equally interested in its defensé and preservation; that the interests of the employer and employee are closely interwoven; that they must work together in harmony for success by being free from the dictation and coercive influences of trades unions or the third party.

Therefore, we declare for the independence of the open shop principles.

A rather unique plan has been provided for an equitable vote whenever meetings are held, and it is necessary to take action on any matter. It is provided that each ballot shall contain the votes of a nequal number of votes of masters and craftsmen, those present voting twice if it should be necessary to equalize the ballot. In case of a tie the matter is referred to an arbitration board composed of equal number of workmen and employers, the whole principle resting upon a conjoint vote. The management of the association is in the hands of a Board of Governors comprising a master and craftsman of each of the building trades. All matters affecting working hours, rules, wages, &c., are to be taken up at the annual meeting and decided for the ensuing year. A fund is provided for distressed members and death benefits.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—II.

BY EDWARD H. CRUSSELL.

In describing what I consider to be the best form of work bench, I am sensible of the fact that I am very likely to run foul of the ideas of some of our best mechanics. This, however, cannot be helped, as for a number of years I have earned my daily bread at the work bench, and have well defined ideas of my own on the subject. In the first place, I consider the biggest abomination in the form of a bench is the one with a well at the back of it—the one in which the front plank is 2 or 3 in. higher than the rest of the bench, leaving a depression at the rear side which answers no useful purpose, and is always full of nails, shavings and rubbish. The ideal surface for a bench top is one that is perfectly flat and level. A bench of this kind can easily be cleaned off, the tools will stay in their places on it, and when one has a wide panel or something similar on which to work the mechanic can do so without putting blocks of wood at the back of the bench to make it the same as the front.

At one time I labored under the impression that drawers in the front of the work bench were good things, but I have been forced to the conclusion that they are more of a nuisance than blessing. There is nothing more exasperating than to have a large piece of work, such, for example, as a counter top, fastened in front of the bench and discover that it is necessary to remove it in order to get at some tool which is reposing in a drawer behind it. After one or two lessons of this kind the mechanic is very apt to decide that there are handier places in which to keep tools than bench drawers.

What I consider a good bench for shop purposes is shown in front elevation in Fig. 10, and in end elevation in Fig. 11. For jobbing work the bench should not be less than 12 ft. long and may, if there is sufficient room, be as much as 16 ft. in length. As regards width it may be from 2 ft. 4 in. to 3 ft., and in hight from 2 ft. 6 in. to 2 ft. 8 in. An English authority gives the high as 2 ft. 4 in. Of course it depends somewhat upon the class of work to be done, but any one who would need a lower bench than this would certainly answer to the name of "shorty."

In order to keep the bench top straight and prevent it from sagging in the center, it should have plenty of supports—three in a 12-in. bench, and 4 in a 16-in. bench. One of the supports is shown in end and side elevation in Fig. 12. The legs are 3 x 4 in. or 4 x 4 in.; the top cross piece is 2 x 6 in., and the lower one is 1 x 6 in. The lower one is kept up from the floor far enough to allow of the passage of a broom under it.

The top of the bench is composed of 2-in. planks square jointed and doweled. Avoid the use of a tongued and grooved joint, because when the top shrinks and the joints open, sawdust, small brads, &c., will get into them, and the tongue will prevent them falling through. It is well not to make the square joints too square, shoot them a little under so that anything getting in at the top will have a chance to get through on the under side. It is perhaps hardly necessary for me to point out that such things as small brads in the joints of the bench top can do a lot of damage to the edges of bench tools or the surface of any work that may come in contact with them. The top of the bench should be fastened securely to the supports with screws in countersunk holes, use two screws in each plank at each support—one close to each edge of the plank to prevent it curling.

The front of the bench is also composed of 2-in. material—the top piece about 10 in. wide, and the lower one 4 in. The lower edge of the top piece and the upper edge of the lower piece are grooved to receive the tongue of the slide shown in the side or end elevation of the work bench, Fig. 11. This slide is made of oak or other hardwood. It is 10 in. wide, and 1½ in. thick. It can be moved from one end of the bench to the other, according to requirements. The front of the bench being 2 in. thick gives a much better hold to the pins that are used for supporting the end of the work opposite that laid in the vise. It also makes it possible to gain the legs half an inch into the front plank, which will overcome all tendency to rack the bench endways, and, altogether, makes a much stiffer and more desirable bench front than the ordinary.

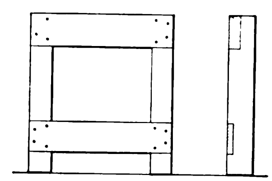


Fig. 12.—Details of Bench Support.

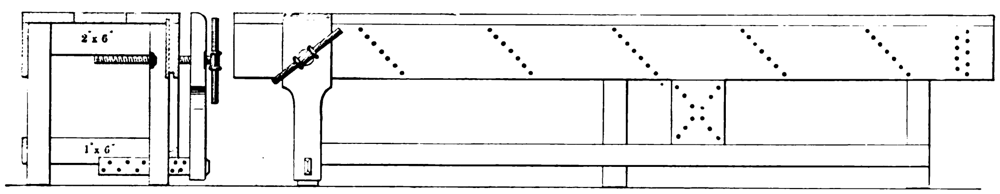


Fig. 11.—End Elevation. Fig. 10.—Front Elevation of Work Bench.

The Jobbing Carpenter and Some of His Work.—II.

In the end elevation, Fig. 11, the front plank is shown as tongued into the bench top. The reason for this is that continually gripping small pieces in the top portion of the vise soon forces the top of the bench away from the front plank, leaving an uneven surface, which has a tendency to split thin material when gripped in the vise. The tongued and grooved joint is easily made and obviates all this.

The choice of a bench vise is largely a matter of individual preference. The one represented is of the old-fashioned kind, and the drawings indicate quite clearly the manner of fitting. For my own use, I prefer to have the wooden handle of the vise driven tightly into the socket of the screw, so that an equal portion projects on each side. It is much easier to get hold of and quicker to work with than when left loose in the socket.

The bench stop should be bought. I have probably made and tried as many home-made bench stops as most mechanics, and believe that the poorest bench stop on the market to-day is as good as the best home-made one, while a lot of them are better. The chief advantage of the boughten one is ease and nicety of adjustment, this being especially noticeable when one is planing thin material.

Before the bench stop is fitted the top of the bench should be dressed off perfectly flat and straight in all directions, and when fitting the bench stop it should be sunk a little below the surface of the top of the bench. The holes that are bored in the front of the bench for the supporting pins are 1 in. in diameter, and should all

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—Editor *Carpentry and Building*.

be bored in some kind of regular order, when the bench is first made. The pins should be turned, and it is a good scheme to paint them vermillion. The turned pins are not so liable to be thrown away as are whittled ones, and the vermillion color prevents them getting lost in the shavings.

If the bench is to be a double one both sides should of course be made alike, but if it is to stand against a wall a ⅞-in. board will be heavy enough for the rear side. In this latter case the top may be made to overhang a little on the back side, so that if the planks of which it is composed shrink very much they may be taken off and clamped up tight again.

After the bench is finished it should be set up level in the position it is to occupy, and the legs should be scraped and fitted to the floor. After this, if one feels like going to the expense of a coat of hard oil finish for the top of it he will be surprised at the extra length of time the bench will stay in good condition.

I presume there are mechanics who will think that a bench built to these specifications will prove an unnecessary waste of time and material. Well, we cannot all think alike, and it has been my experience that the extra facilities for doing good work as afforded by a bench of this kind over the rattle-trap affair usually constructed will in a short time pay for the entire cost of the bench, in addition to which the workman will take more care of it, and keep it in better order.

There are other workshop appliances that the workman requires, and it is my intention to touch upon them a little later, but for the present will leave this part of the subject, and will commence work in earnest. Our first example will be the cutting of a doorway through a lath and plaster partition wall.

Making Window Frames.

The making of window frames is part of the business of every planing mill catering to the building trade, and it is a part that is practically always done to special orders, says a writer in a recent issue of the *Wood Worker*. From time to time, efforts have been made to get this work more in hand, so that quantities of window frames can be made up during the dull season of the winter and have them on hand when the busy building season comes on, thus having something to do in the winter and have the stock ready to help out in the busy times. By making them up in large quantities they could be made up at less cost on machines. But it has been difficult to get much good out of this idea because of the wide diversity of requirements. Yet it looks like now the tide has turned in favor of the making up of stock sizes in advance.

In fact, this window frame business, like the column business, is being specialized more or less, and some people are going into it and furnishing window frames either made up or all cut out ready to be made up, just like people making a specialty of furnishing columns for the retail lumberman. Of course, it is impossible to carry all the great varieties of sizes and designs, but there is seemingly an effort on the part of retailers now to try and push certain stock sizes so that they can carry them in stock just like they carry the sash. This is a move that should be encouraged by planing mill people, because it gives the planing mills a chance to make something out of the window frame business, in building up trade among the different dealers in their territory, and to keep busy during the winter months and other slack periods by making up stock frames and having them ready. In addition to pushing this branch of the business, and making a feature of window frames, they can enlarge on the work considerably by having the stock already run through the sticker and having the equipment in such good shape generally that when an order comes for a special lot of windows for a house they can be furnished promptly. Some planing-mills make such a feature of this quick action in furnishing frames made to order that they can take an order for frames for an ordinary dwelling, and turn them out and deliver them inside of 24 hr. It takes a little extra work and trouble in the way of being prepared to do work in this way, but it seems to be worth while because it helps get business.

The best chance of profit, however, in the window frame business comes from the standardizing of them as much as possible in sizes and kinds, and the making of them in larger quantities. This gives a chance to furnish them for less money and still make a better profit out of the business than if each set of frames is made separately to order. So it is worth while to study this end of the business and see how much it can be enlarged upon by diligent effort.

Laying Concrete in Cold Weather.

It is always risky work for property owners or builders to lay concrete during cold weather, but in extreme cases this class of work can be done if proper precautions are taken. In the cold and damp winter months concrete sets more slowly than during the warm periods, and for this reason it is argued that the centering under it must be left in position for a proportionately long time. A writer in a recent issue of *Municipal Engineering* says that below a temperature of 50 degrees F. concrete sets slowly, and below 40 degrees is very inactive. At 32 degrees concrete freezes before setting. Remove any concrete known to have been frozen. A slight frost extending only one-fourth of an inch into concrete is not detrimental to strength. Some builders claim that concrete can be frozen, thawed out, and will then reset. This may be so in many cases, but it is always best to remove any concrete in which the freezing has extended throughout the mass.

Concrete work can be carried on when the temperature is as low as 20 degrees (never lower), if the precaution is taken to encase the building with canvas and place heating grates or salamanders under the floor being concreted. Keep the building at a uniform temperature of about 60 degrees. Do not allow intense heat to come in contact with the concrete, as it will dry out the concrete before it has set. Cover the concrete after being laid with some good insulating material, such as sawdust, straw, cement bags, manure, &c. Be sure to cover the concrete work before stopping work at night, even though it is warm during the day time. Salt dissolved in the water used in mixing concrete helps to prevent freezing by lowering the freezing point. A 5 per cent. solution (by weight) of common salt is ordinarily used and is not detrimental to strength when so used. Calcium chloride has an advantage over salt in that it reduces the freezing to a lower point. Dissolve in the water needed to properly mix the concrete 2 lb. of calcium chloride for each bag of cement used.

Heating the cement, sand, stone and water used in the concrete is helpful, but the materials must never be heated to a temperature of over 100 degrees, as the strength of the concrete will be weakened. Be sure that the concrete is thoroughly set (not frozen) before any centering is taken down. Leaving all the upright supports in place, remove the sides of the columns and beam boxes and thoroughly examine the concrete. Then remove the slab centering, and lastly the main supports. Leave the centering in place a few days longer rather than take chances. Do not take down the centering too soon.

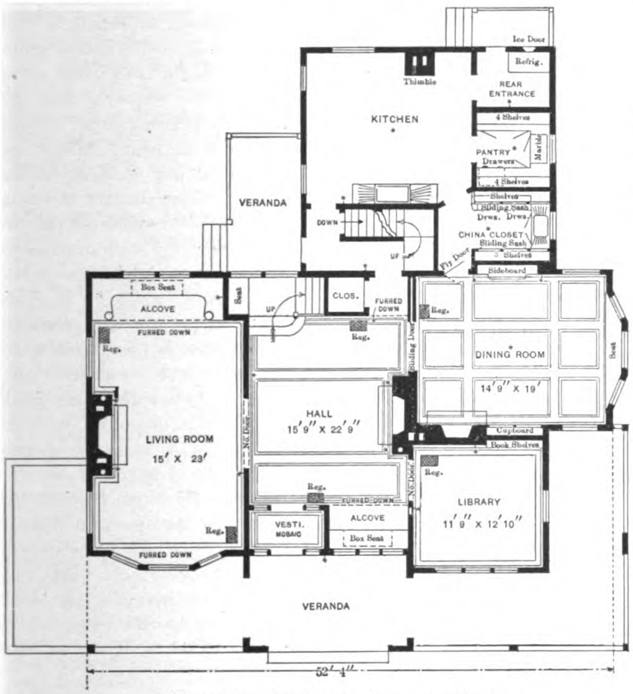
Waxing Cement Floors for Dancing Halls.

A method of waxing a cement floor so that the room can be used for dancing purposes is thus described in a recent issue of *The Painters' Magazine:* Cement floors are as a rule too porous to be waxed successfully without being first filled. Though rather expensive, shellac varnish is most convenient and best adopted for preparing the floors in the shortest possible time. Two thin coats of orange or brown gum shellac dissolved in denatured alcohol will give the proper foundation for the wax, which should be ordinary floor wax applied with a cloth or brush and polished with a weighted floor brush in he usual manner.

A HOUSE AT SWAMPSCOTT, MASS.

(*With supplemental plate.*)

WE have taken for the subject of our half-tone supplement plate this month a very attractive dwelling located at one of the many delightfully picturesque places on the eastern Massachusetts coast, a section which, in fact, has become famous for its beautiful homes. A study of the picture will readily show the exterior architectural treatment, while the plans presented herewith afford an



First Floor.—Scale 1-16 In. to the Foot.

excellent conception of the arrangement of rooms on the first and second floors.

It will be seen that from the vestibule opens a capacious reception hall, with alcove at the front lighted by a triple window, while at the side is an open fireplace. The main flight of stairs leading to the second floor is directly at the rear of the hall and lands upstairs near the center of the building. The living room at the left of the main entrance is a capacious apartment with bay window at the front and alcove at the rear, while at the side is a large open fireplace. At the right of the reception hall are library and dining room, while beyond is the kitchen with its pantry, refrigerator space, &c., &c. Communication between the kitchen and dining room is established by means of a china closet. On the second floor the main portion of the building provides three sleeping rooms and a sewing room, the principal chamber having opening out of it a dressing room and toilet. The extension over the kitchen provides accommodations for two servants' rooms, two bathrooms and rear stairs.

In passing it may be mentioned that the hall, library and living room have floors of quartered oak, while the finish is in white wood. The dining room has a floor and finish of quartered oak, and a panel dado 4 ft. high. The finish of the kitchen is in birch and the floor is of rift hard pine. The bathroom on the second floor has a tiled wainscoting 5 ft. high and a floor of quartered oak.

The residence is that of Frank H. Gage, located at Phillips Beach, Swampscott, Mass., and the drawings were prepared by Architects Loring & Phipps, 53 State street, Boston, Mass.

Second Floor.—Scale, 1-16 In. to the Foot.

A House at Swampscott, Mass.—Loring & Phipps, Architects, Boston.

THE plans recently submitted to the directors and Building Committee of the Second National Bank, Pittsburgh, Pa., by Architects Alden & Harlow for a new structure on the site of the present building have been approved and the work of erection will commence at the earliest opportunity. The proposed building will be 36 x 110 ft., and will cost about $300,000. It will be 10 stories in hight, the first three of which will be occupied by the banking institution. The remaining seven floors will be fitted up as offices.

Progress in Wood Preservation.

For several years the Forest Service has been experimenting with a method of impregnating wood, which requires no expensive equipment, is simple in operation and is adapted to a plant of any desired capacity. It is now known that all of the more porous woods can be treated successfully by this method. The method is called the "open tank" or "hot and cold bath" process. The impregnation is accomplished by thoroughly heating the timber in a tank containing a liquid substance, then running off the hot liquid and filling the tank with cold, or transferring the timber from a tank containing hot to a tank containing cold liquid, or allowing the whole to cool without change.

The theory of the process is that the air in the wood cells and intercellular spaces expands when heated and is partially expelled. Upon cooling it again contracts, thus causing a partial vacuum, and the pressure of the air on the outside forces the liquid into the wood. The process may be applied with any of the preservatives in common use, as, for instance, creosote oil and zinc chlorid solution. The principle is the same whether the treating is done in large or small tanks.

The results of the Government's extensive experiments in wood preservation are published in bulletins, which may be had by all interested persons who address the Forester at Washington, D. C.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - TREASURER
GEO. W. COPE, - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

FEBRUARY, 1909.

Pittsburgh's Unique Church-Office Building.

Should the present plans be carried to a successful conclusion there will soon be erected upon the historic site of the oldest religious congregation in the city of Pittsburg a church and office structure which will be unique among the country's examples of imposing architecture. The combination building will rise on the block now occupied in part by the church of the first German Evangelical Protestant congregation, which traces its origin back to the year 1782. The site upon which the church and adjoining buildings now stand is regarded as one of the most valuable in the congested business district, and while the property is too spacious for church purposes alone, measuring as it does 240 x 110 ft., at the same time the business buildings are wholly inadequate. The structure, which has been designed by Architect E. C. F. Ernst, consists of a solid block in one street front of which is the church edifice flanked and surmounted as it were by a business building 14 stories in hight. The right and left wings unite with the trunk of the business building above the sixth floor, so that the entire space from the seventh to the top floors may be devoted to offices, of which each floor will have 58. The business sections of the right and left wings may be occupied by two separate establishments if desired, or they can be devoted to one enterprise if necessary, as the rear entrance forms a connecting passage. On the upper floor is a large assembly hall 240 x 110 ft. in area with a pilaster façade built around the light court. The church auditorium is 80 ft. wide amply lighted by 10 large windows opening on the street, as well as by a 24 x 48 ft. skylight and several windows 20 ft. wide bordering on the light court. The hight is 48 ft. to the cove and 62 ft. to the crown of the dome. The main floor has a seating capacity of 860 and with one gallery will seat 1150 people. On the sixth floor are the social rooms of the congregation and at this level is also placed the church clock, which has a face 10 ft. in diameter. The architecture of the church is pure Gothic, while the rest of the structure is of the Renaissance type. Three large portals admit to the vestibule 48 ft. wide, where on both sides staircases 8 ft. wide lead to the main floor of the church auditorium. The architect's design shows at the peak of the front gable, a distance of 128 ft. from the street level, an eagle holding in its talons the American and German flags.

Liability for Accidents and Labor Organizations.

Those who are apt at spending other people's money to relieve the sufferings of a third party have been enjoying an unusual opportunity for open handed generosity in pushing legislation in behalf of employers' liability for accidents. The foundation is laid by bloodcurdling accounts of the conditions under which workmen must labor, of the risks which they incur, and of the frightful fatalities whose victims they are. Statistics are paraded without any indication as to their source or proof of their accuracy, beyond the label "official." Add some telling interviews to indicate the callous indifference of the cruel employer, cap it off with some touches showing how he rolls in predatory wealth and the ground is prepared for demands in behalf of the slaughtered worker for a share of the ill-gotten gain. Since it is only evening up, how easy it is to sweep aside all other considerations and let the employer bear all responsibility, expressed in nicely rounded sums, for injury to life and limb. Such little incidental features as contributory negligence are buried out of sight by an avalanche of maudlin sentiment. Some straight thinking is eminently desirable before these self-constituted philanthropists are allowed to have their way with other people's money. There should be as careful and accurate a distribution of responsibility as is possible in so complex a matter. It is the duty of the employer, and we may add that it is the part of wisdom, too, for him to adopt every safeguard which experience has shown to be desirable. We go even so far as to say that he should adopt them, even though he suffers in output, and in extreme cases even in quality. It is the duty of the employer to keep his men constantly conscious of danger, by warning, backed by unswerving discipline. He is liable for any accident due to defects of machinery, to faulty design of plant, and to the carrying out of mistaken orders. It is probable that he will be held liable for accidents due to risks inherent in the nature of the business. But there his responsibility should cease. The considerations of the other side of the case may be outlined as follows:

Placing the Reponsibility.

Injury or death caused by the recklessness or negligence of a workman, whether he be the only sufferer or whether he involve fellow workers, should not be made a charge against the employer. Such a shifting of the responsibility is a patent cause for accidents, with all the attendant suffering, which the outside philanthropist is so eager to avoid. Unless it is placed where it belongs little or no improvement can be expected. Experienced and serious workmen, recognizing the danger to themselves which grows out of negligence or recklessness on the part of fellow workmen, have often an emphatic way of entering their protest to the guilty one. But only too many wink at infractions of shop rules devised for safety, and their *esprit du corps* invariably prevents them from bringing an offender to book by reporting him. While the watchfulness of some individuals in every shop undoubtedly prevents many casualties, it does not go far enough. It is an entirely different matter when there is an organization among the workmen, and yet where is there a record of a union, capable of distributing among the many the burdens due to an accident too heavy to be borne by one or a few sufferers, assuming the liability? We are told that the employer should be held liable in every case, because he has got the money to pay, and otherwise the sufferer from an accident due to his own fault or that of a fellow workman would not get anything. We hold that it is not to the employer, but to the union, that the victim should look for compensation. But their motto appears to be "Millions for war, but not a cent for charity." It is true that some unions have pretended to protect themselves against the danger of ignorant fellow workman by securing State laws calling for a certificate of skill, but that was done merely to keep the supply of labor in check. Miners' unions have resorted to such tactics, but is there a single case on record of a miners' union expelling a member because he struck a match underground or picked a safety lamp lock to light his pipe in a fiery mine, at the risk of blowing up hundreds of men and destroying valuable property? Organized labor rather than the employer should be held liable for accidents due to negligence and recklessness of its members, if it be an axiom that in some manner the burdens of such casualty, being too heavy to be borne by the guilty individual, should be distributed. It might then be found that the unions would be willing to support reasonable shop discipline, instead of defeating it by indifference or even by deliberate hostility.

Officers and Schedule of Charges of American Institute of Architects.

At the forty-second annual convention of the American Institute of Architects, held in Washington, D. C., December 15 to 17, and which was in many ways a most interesting and instructive gathering of the architectural fraternity, the following officers were elected for the ensuing year:

President, Cass Gilbert.

Vice-Presidents, Ralph Adams Cram, Irving K. Pond.

Secretary and Treasurer, Glenn Brown.

The directors elected for the ensuing year were F. C. Baldwin, S. B. P. Trowbridge and John M. Carrere.

One of the most important results of the convention was the adoption of a revised schedule of minimum charges and professional practice of architects which we give herewith:

1. The architect's professional services consist of the necessary conferences, the preparation of preliminary studies, working drawings, specifications, large scale and full size detail drawings, and of the general direction and supervision of the work, for which, except as hereinafter mentioned, the minimum charge, based upon the total cost* of the work complete, is 6 per cent.

2. On residential work, on alterations to existing buildings, on monuments, furniture, decorative and cabinet work and landscape architecture, it is proper to make a higher charge than above indicated.

3. The architect is entitled to compensation for articles purchased under his direction, even though not designed by him.

4. If an operation is conducted under separate contracts, rather than under a general contract, it is proper to charge a special fee in addition to the charges mentioned elsewhere in this schedule.

5. Where the architect is not otherwise retained, consultation fees for professional advice are to be paid in proportion to the importance of the questions involved and services rendered.

6. Where heating, ventilating, mechanical, structural, electrical and sanitary problems are of such a nature as to require the services of a specialist, the owner is to pay for such services. Chemical and mechanical tests and surveys, when required, are to be paid for by the owner.

7. Necessary traveling expenses are to be paid by the owner.

8. If, after a definite scheme has been approved, changes in drawings, specifications or other documents are required by the owner; or if the architect be put to extra labor or expense by the delinquency or insolvency of a contractor, the architect shall be paid for such additional services and expense.

9. Payments to the architect are due as his work progresses in the following order: Upon completion of the preliminary studies, one-fifth of the entire fee; upon completion of specifications and general working drawings (exclusive of details), two fifths additional, the remainder being due from time to time in proportion to the amount of service rendered. Until an actual estimate is received, charges are based upon the proposed cost of the work, and payments received are on account of the entire fee.

10. In case of the abandonment or suspension of the work, the basis of settlement is to be as follows: For preliminary studies, a fee in accordance with the character and magnitude of the work; for preliminary studies, specifications and general working drawings (exclusive of details), three-fifths of the fee for complete services.

11. The supervision of an architect (as distinguished from the continuous personal superintendence which may be secured by the employment of a clerk of the works or superintendent of construction) means such inspection by the architect or his deputy, of work in studios and shops or a building or other work in process of erection, completion or alteration, as he finds necessary to ascertain whether it is being executed in general conformity with his drawings and specifications or directions. He has authority to reject any part of the work which does not so conform and to order its removal and reconstruction. He has authority to act in emergencies that may arise in the course of construction, to order necessary changes and to define the intent and meaning of the drawings and specifications. On operations where a clerk of the works or superintendent of construction is required, the architect shall employ such assistance at the owner's expense.

12. Drawings and specifications, as instruments of service, are the property of the architect.

* The total cost is to be interpreted as the cost of all materials and labor necessary to complete the work, plus contractors' profits and expenses, as such cost would be if all materials were new and all labor fully paid, at market price current when the work was ordered.

Minnesota Employers' Association.

The Minnesota Employers' Association is the name of an organization which has just been incorporated at St. Paul, Minn., for the purpose of looking after the legislation affecting the general employing interests in the State named. It is designed to bring about greater safety for employees and more rigid inspection of factories and other places of employment and a situation such that when accidents happen a means will be at hand whereby settlement can be effected on an equitable basis without wasting the funds of employers and employees in expensive litigation. One point which the association desires to emphasize is that it has not been formed for the purpose of adjusting wages, but rather to secure improved conditions, fair and equitable to those interested in all matters which can be and are regulated by law.

The officers of the new association are:

President, G. M. Gillette.

First Vice-President, Eli S. Warner.

Second Vice-President, Z. D. Scott.

Third Vice-President, H. N. Leighton.

Fourth Vice-President, C. S. Sultzer.

Fifth Vice-President, L. Sargent.

Treasurer, P. W. Herzog.

Secretary, A. V. Williams.

The office of the association is in the Ryan Building, in which structure is also located the headquarters of the Builders' Exchange.

Wages in the Building Trades for 1909.

The Building Trades of New York City have just issued through the office of the Consolidated Board of Business Agents the schedule of the prevailing rate of wages for 1909, based on 8 hr. work per day, except on Saturday, when work ceases at noon. All work performed between the hours of 5 p.m. and 8 a.m., as well as on Sundays and regular legal holidays, is counted as "double time." The schedule is as follows:

Asbestos workers, boiler felters, pipe coverers, insulators, $4.50; asbestos workers helpers, $2.80; bluestone cutters, flaggers, bridge and curb setters, $4.50; bluestone helpers, $3; boiler makers and iron shipbuilders, $5; boiler makers helpers, $3; carpenters and framers, $5; cabinet makers, $4; cement and concrete masons, $5; cement, concrete and asphalt laborers, $3; derrickmen and riggers, $3.75; elevator constructors and millwrights, $4.50; elevator constructors helpers, $3; electrical workers, $4.50; electricians helpers, $2.20; electrical fixture workers, $4.50; engineers, portable, $27.50 per week, by the day, $5.50; house shorers, movers, sheath pilers, $3.50; house shorers helpers, $2.65; housesmiths, bridgemen, iron workers, $4.80; metallic and wood lathers, $4.50; marble cutters and setters, $5; marble carvers, $5.50; marble polishers, $4; sawyers, $4.25; bed rubbers, $4.50; marble cutters helpers, $3; mosaic workers, $4.25; mosaic workers helpers, $2.75; machine stone workers and rubbers, $4; machine stone workers helpers, $2.75; machinists of all descriptions, $4.50; plasterers, plain and ornamental, $5.50; plasterers laborers, $3.25; plumbers and gas fitters, $5; painters, $4; decorators and gilders, $4.50; riggers on machinery, dynamos, boilers, &c., $3.50; roofers, tar, felt, composition, damp and waterproofers, $3.75; sheet metal workers, coppersmiths, tinsmiths, metal roofers, $4.50; stone cutters, $5; stone setters, $5.50; steam and hot water fitters, hydraulic, pneumatic tube, &c., $5; steam and pipe fitters helpers, $3; tile layers, ceramic, marblelithic, rubber, glass, encaustic, $5; tile layers helpers, $3; terra cotta workers, chippers, cutters and fitters, $3.60; upholsterers of all descriptions, $4.08; wire workers on screens, guards, grills, &c., $4.50.

An Architect's Responsibilities.

There is no more generally recognized maxim of common law than that every man is responsible for a satisfactory performance of that which he undertakes to do. Even if a solicitor should neglect the interests of his clients he may be brought to book and compelled to pay heavy damages whether the neglect is deliberate or the result of ignorance. The same holds true for every calling in life, and it follows naturally that the architect, like every other man, has to take his risks, says a writer in a recent issue of the Toronto *Contract Record*. If he accepts a commission he implies that he considers himself capable of carrying it out properly, and of attending satisfactorily to all his client's interests. If the client gives him a free hand the architect is at liberty to erect as unsightly a building as he chooses, so long as the client approves of the design. In this the architect is like any other artist, and if he is content simply to turn out drawings, leaving the work of supervision and construction to other hands he will be free from all risk if anything goes wrong.

Under the English practice it has been the custom at one time that an architect's responsibility should cease with the drawing up of the plans. This is evidenced by the payment of the charges provided for after the plans and specifications have been drawn and the contract signed. At this stage an architect can withdraw if he desires, and some one else will have to be employed for the supervision. An architect with any ambition or grit, however, will not do this. Unless he has control of the work until its completion he cannot be sure that it will be properly carried out. The result in practice is that most architects supervise their work from beginning to end. The real amount of personal supervision may not be very great, but the responsibility remains, together with the duty of seeing that everything is done as it should be. This is the result of evolution in the practice of architecture and seems to be the best manner in which satisfactory work can be done. There is a growing tendency for the architect to increase the field of his responsibilities by becoming a contractor and versing himself in all the details of construction. Naturally an ambitious man desires to increase his field of work, and no more reasonable outlet for his activities can be obtained than that of attending to the construction of his buildings. No architect wants to shirk work that can be done profitably, and most of them will probably take kindly to anything in the form of supervision or contracting which promises to work toward this end.

If a man should find himself unfit for supervising or contracting the question is a different one, and it not infrequently happens that such a man is able to obtain the benefits of modern practice by forming a partnership with one who will make a specialty of the supervising or contracting end of the work. Failing this there is still another solution for the man who desires to confine himself to designing alone. He may accept a smaller fee than the usual one and be absolved from all responsibility. In England this is made practicable by the employment of quantity surveyors, a profession which has not as yet developed in Canada. It is not a desirable state of affairs that an architect should in this way limit his activities and responsibilities. If he chooses to do so, however, the only alternative is some such plan as the one suggested. Yet any man who has backbone enough to qualify himself as an architect should have enough also to develop in himself the ability to supervise, and accept the responsibility connected with supervising. The work of supervision, with all its accompanying risks, does much to elevate an architect above the grade of the simple artist or designer.

A Book on the Sewerage of Buildings.

A new work under the title, "The Sanitary Sewerage of Buildings," by Thomas S. Ainge, sanitary engineer of the Michigan Department of Health, comprising 209 pages, is published by *Domestic Engineering* of Chicago. The introduction dwells upon the necessity of careful disposal of the household waste as a preventive of disease. The first chapter takes up the general principles involved and is followed by a chapter on outside sewers, their construction, their arrangement and what should be done to insure the highest efficiency, engravings being used to make the text clear. One photograph shows the condition in a tile sewer, where tiles are partially filled from the leakage around the joints. The chapter on inside sewers and the soil and vent pipes deals entirely with the piping system within the building, giving tables and illustrations of value both for instruction and reference. The necessity of a roughing in test and devices for making the test forms another chapter. The chapter on plumbing fixtures gives valuable information in reference to those used for both households and public buildings. Considerable space is given to the subject of traps, their construction, efficiency, the safeguard they afford, methods of applying the vent pipe to them, thus making their object and usefulness readily understood by the student. The final test and inspection is another subject, followed by a chapter on the disposal of sewage, dealing with the space required for the disposal of a given amount of sewage, giving information about constructions for the septic treatment of sewage, and all leading to the one conclusion, that the greatest care is of the greatest advantage to the health of the people in any community.

An Old Aberdeen Building.

It appears that the renovation of a celebrated old building in Aberdeen has brought to light some interesting examples of decorative art of the end of the seventeenth century. The building referred to stands in the Guestrow—one of the slum districts of the city—and was erected about 1676, although a portion of it dates back to 1580. During the Jacobite rebellion of 1745 the house was lent by its then owner—Mr. Thomson, an advocate—to the Duke of Cumberland, who occupied it as his residence during his six weeks' stay in the city, and not only made very free with all it contained, but on his departure carried off all the valuables he could possess himself of. Since that date, says an English exchange, the house has changed hands many times, and latterly had been used as a common lodging house. It was in a small paneled apartment—probably an antechamber—that the discovery referred to was made. Ordinarily one would have expected that the panels themselves would have been the portions decorated with subjects; but it is not so in this case. The panels have been painted very boldly with an effective imitation of marble, and the stiles and rails enclosing the panels have been carefully and minutely treated with painted decoration on a black ground. The decorations include groups of figures, landscapes with trees and with towers, spires, castles and ruins. The work has been done with great skill, and is evidently by a thorough craftsman. To all appearance, the painting is contemporaneous with the date of the erection of the house, so it is probably about 230 years old. The ceiling of a small apartment in the older part of the house is painted in the Flemish manner. One of the panels, although much faded, evidently portrays the Ascension, and another the Crown of Thorns and the Five Wounds. This apartment was probably used as a private chapel.

FORMING NICHES IN PLASTER.

BY WILLIAM GREGORY.

RUNNING or forming niches in plaster, being a job which falls to the lot of a few plasterers, the writer will here show one of several methods he has tried, and which he believes to be the simplest and quickest way to complete a good, clean job. The method employed will be to run the crown or head with a mold and finish the rest by hand. As the writer is not aware of any proportions or fixed rule in forming niches, we will assume this one to be formed in a solid brick or concrete wall for the purpose of placing a life sized statue therein, and that the opening will be 6 ft. in hight from base to crown and 2 ft. in width, or diameter on plan, and that it will be finished to a plain arris all around. They may, however, be enriched with panels, shells, &c., in the crown, and with architraves, pilasters, &c., run on the sides.

Having browned the face of the wall plumb we will make a mold 1 in. square, as shown in Fig. 1 of the illustrations, to describe a circle 2 ft. in diameter. This should be run on the gauge board similar to running a band for encircling a column. This we cut through the center. Having gauged a little high stuff, fix one-half of the circle, say 12 in. from the floor or base line, the other near the springing line, and with plumb line and gauges fix the two plumb and in right position, keeping the two as near level as possible to the eye. Next back up two

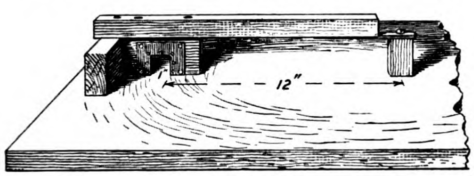


Fig. 1.—Mold in Position for Describing Circle.

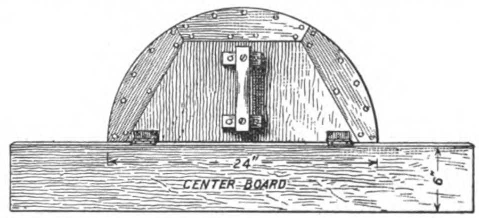


Fig. 2.—Center Board with Mold for Head of the Niche.

Forming Niches in Plaster.

good straight rods to form the arrises; then brown the inside to a good face with Portland cement.

We next fix our center board, to which the mold is hinged, in position, as indicated in Fig. 2, to form the crown or head of the niche, taking care that the board is set level and correct at the springing line. Fix a handle on the mold, as shown, by which to work the mold backwards and forwards. Having previously browned the job out, allowing sufficient thickness for the finishing coat, we now complete the crown with Keene's or Parian's cement, after which we take down the center board and mold and finish the bottom portion with the trowel and joint rule, taking care to make clean joinings and arrises, and leaving everything very clean. A high, glossy finish can be obtained in the niche by continuous troweling and finally rubbing down well with a clean cloth.

A Supersalubrious House in Japan.

A house has been erected at Yokohama, Japan, to fulfill the following requirements: 1. To embody all desirable conditions possible from a hygienic standpoint. 2. To protect the inhabitants against sharp changes of temperature. 3. To reduce to a minimum the consumption of fuel. 4. To provide the residence against the numerous earthquakes of the country. In general dimensions the house, according to the description in a French contemporary, is 44 ft. long, 23 ft. wide, 17 ft. high. In exterior appearance it has the form of a rectangular box well lighted, though it has no doors nor windows, and presents no joints or crevices through which air, moisture in the atmosphere, dust, insects or microbes can enter. It appears to be a veritable dream of the sanitarian. It is constructed of glass in the form of slabs about 36 in. long, 24 in. wide and 5 in. thick. The wall contains an air space 4 in. thick filled with a saturated aqueous solution of alum or of a salt of sodium, like common salt.

The two glass surfaces forming the wall with its air space are fitted to a framework of cast iron. The roof is made with glass tiles, with the joints closed by means of rubber. On the tiles is laid a bed of cinders, and finally is laid a lattice work of wood covered with cement. The roof is thus translucent like the walls, but does not resist to so great an extent the penetration of heat from outside or the loss from the interior. The saline solution between the faces of the walls can be colored to suit the taste of the owner, and under the action of the intense rays of the sun the light, it is stated, enters diffused and softened. The main floor is formed of two layers of boards separated by a cushion of sawdust. The air to the building is admitted through grills.

It is through the cellar that one enters the house, passing through a lobby leading to a stairway from the cellar. The doors of the lobby are arranged so that on going in or out a person moves a minimum quantity of air. The supply of air is obtained by means of pipes which rise vertically above the ground at a distance from the house, communicating with other pipes discharging into an air chamber. Before its admission into this space the air is filtered by passing through cotton and then on emerging from the cotton flows over a large glass plate coated with glycerine to retain the microbes which the cotton has allowed to pass. Thus purified, the air enters the main part of the house through the grills mentioned, of which the openings can be regulated at will. The outflow of the air is effected through openings at points where in our houses a molding would be located. At this level the building is incircled on the outside by a sort of boxing of ordinary vitrified glass, with which the openings mentioned communicate. The heat developed in this box by the sun's rays is generally sufficient to establish a draft and bring about a current of air toward an exhaust chimney, which is also constructed to take advantage of the sun's rays. An opening allows for discharging rain water at the base of this chimney in such a manner as to assist the draft. The result is that the greater the strength of the sun or the greater the quantity of the rain fall, the greater the degree of ventilation. If, on the other hand, heat from the sun is deficient and it is not raining at the same time the draft necessary can be obtained by a small stove installed in the air chamber.

To resist earthquakes the piers of the foundation of the building are on the lower part rounded so as to rest freely in hemispherical holes. Since the erection of the building it has resisted more than 300 earthquakes of more or less intensity.

One thus finds as a result of the particular arrangements that this house is free from the inconveniences to which for the greater part of the time Japanese buildings are exposed. The air which reaches the interior is pure and cleansed of contaminating germs. The temperature does not vary sharply, and in winter it remains always sufficiently high. It is only after four or five days without bright sunlight, which condition is rare, that it is necessary to heat the air at its entrance. The expense of fuel is thus reduced to a minimum. The office performed in this connection by the solution between the surfaces of the walls is the following: During the day when the sun is in evidence the heat that is admitted instead of crossing the glass heats the intermediate liquid and the large quantity of the salt in solution; on the other hand, during the night when the temperature lowers and the liquid gives up heat there is a tendency of crystallization in the saturated solution which phenomenon manifests itself particularly in a giving up of heat. As the dwelling is surrounded by a glazed veranda one can appreciate that the heat thus disengaged cannot escape altogether and serves correspondingly to maintain the temperature indoors.

A Reinforced Concrete Lighthouse.

A most interesting application of the use of reinforced concrete is found in the construction of a lighthouse on the submerged rocky plateau of Rochebonne, situated about 65 miles off the coast of France. The Rochebonne Rocks constitute a very dangerous reef in the track of ships sailing across the Gulf of Gascony, since the principal summits are in some cases 13 ft. beneath the level of low tides, and the entire plateau is some 164 ft. above the sea bottom in the vicinity. The presence of this dangerous reef has hitherto only been marked by a lightship, but for some 40 years past it has been proposed to erect a lighthouse. The difficulties, however, proved to be so great that the idea had to be abandoned until 1897, when the introduction of the use of reinforced concrete for constructive purposes rendered it possible to propound a scheme capable of being carried out successfully. Even thus the difficulties have proved to be great, for, after 10 years of hard work carried on continuously, there is still nothing to be seen above water.

The first portion of the undertaking, which is now completed, consisted of the preparation of a circular concrete mass about 65 ft. in diameter, placed on the reef, the summit of which is at a level of 14.76 ft. beneath low water mark. This platform has been constructed with quick setting cement, and the length of time taken for the work is to be explained by the fact that only a small number of workmen could be employed on it at once, and that work was only posible during a few days in each year. Only two divers were engaged, and the sea was so rough that even at the best time of year several weeks frequently passed during which it was impossible to work under water.

The second portion of the undertaking will be that of placing a caisson on this circular foundation, constructed of reinforced concrete, and when this has been done the erection of the lighthouse can proceed entirely out of the water.

The caisson has actually been constructed at La Palice, and the contractors now only wait from day to day for favorable weather for placing it in position, says a correspondent writing to the Engineering Supplement of the London *Times*. This will be an extremely delicate operation in consequence of the presence of the surrounding rocks, and the work will have to be executed with the utmost precision, because the free space outside the caisson will scarcely exceed 20 in. all round. The structure in question is 55.11 ft. in diameter and 30.5 ft. in hight; it is composed of a cylindrical body or carcase formed of reinforced concrete, divided into four equal sections. Each of these sections comprises 36 compartments, resulting from the placing of the reinforcing bars. The whole caisson is stayed by trusses, also formed of armored concrete, which cross one another at right angles and interlace with four vertical posts. Placed centrally is an upright, specially braced, and intended for the support of the working platforms. On this will be fixed a transporter crane and a pump to remove the water. The lower part of the caisson is closed by a floor of reinforced concrete, and below this decking there will be a working chamber 4½ ft. in hight.

As soon as the caisson is dropped onto the foundation this bottom chamber will be pumped free of water, and it will then be filled with cement concrete to anchor the structure firmly to the concrete base. The next step will be to fill the caisson itself with concrete, and for this purpose it is intended to use the transporter crane, the arms of which will raise the material from special vessels brought from La Rochelle and moored close to the works.

The caisson, whic has been built at La Palice, the outer port of La Rochelle, will be brought to the reef in the following way: It has been surrounded with metal pontoons, taking the form of a hollow cylindrical ring, and it has been fitted up with a prow and stern. It will be towed to the plateau of Rochebonne, and when it has been brought into the exact place it is to occupy, it will be sunk onto the platform by cutting through the metal attachments which secure the concrete work to the iron pontoons. When this second stage of the work is finished it is intended to erect on the substructure thus provided a tower which will likewise be constructed in armored concrete.

The complete scheme includes the deposition of a protective belt of concrete which will take the form of an outer coating of concrete round the caisson and its foundation. These works have been designed by Mr. Lombard, and they are being carried out under his supervision.

Northwestern Cement Products Association.

The Northwestern Cement Products Association has just been incorporated under the laws of the State of Minnesota with headquarters at Minneapolis, the purposes being the promotion of the industry and the mutual welfare, protection and pleasure of the members.

The officers are: President, Martin T. Roche, St. Paul; secretary, J. C. Van Doorn, 386 Security Bank Building, Minneapolis, Minn., and treasurer, J. M. Hazen, Minneapolis, Minn.

The association will hold its fifth annual convention in the Armory at Minneapolis on March 2, 3 and 4, there being available in the Armory a floor space of 25,000 sq. ft., with broad galleries, well lighted and heated, and only a block from the principal car lines.

Kalsomining Rough Sand Finished Walls.

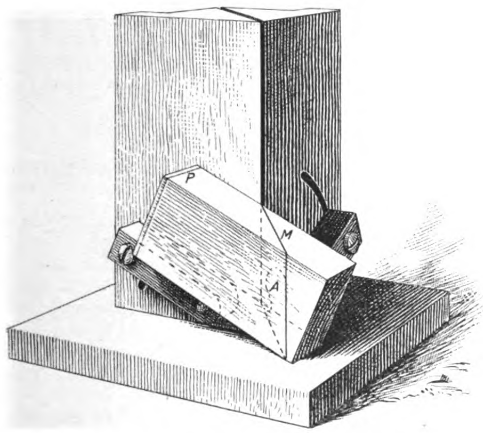
An interesting method of preparing the walls of an interior, mixing the kalsomine for a cream tint and describing how to rekalsomine interior walls which are finished in rough sand style, is presented in a recent issue of *The Painters' Magazine* in reply to a correspondent in California asking for the desired information.

If the walls are smoky or otherwise dirty, wash them down with soap and water, using brushes if need be, and sponge down with clear water. When dry, apply a size made as follows: 1 lb. of good pale glue, 1 lb. of yellow bar soap and 2 lb. alum, each separately dissolved in hot water, are mixed, first the glue and soap, then the alum solution slowly added. When all are well together, add enough lukewarm water to make it the consistency of thin varnish. If the first coat of size goes in unevenly apply a second coat. The glue used in making the size should be soaked in cold water overnight. To prepare the kalsomine, soak overnight in cold water sufficient to cover it, 1 lb. of colorless gelatine glue. Also place in a tub 30 lb. of English cliffstone Paris white, bolted or best bolted gilder's whiting and cover same with water, allowing it to soak overnight. Next morning dissolve the glue in the usual manner in the hot water bath, also heat the whiting and water to the boiling point, but do not let it boil. You can do this with steam or over a moderate fire, and when both are heated mix them and add more water. While doing this have ready a jar of distemper color, yellow ochre ground in water, which thin with water and add to the glue and whiting mixture. One-half pint jar is sufficient for light cream tint; if you desire it darker, add more ochre. Test the tint by placing some of the mixture on white blotting paper, and when the tint is right run the kalsomine through a paint strainer.

CORRESPONDENCE.

Miter Box to Cut Raking Moldings.

From J. B., Providence, R. I.—I am sending a sketch of a miter box which is intended for use in cutting raking moldings, valley jack rafters, or, in fact, any jack rafter according to requirements. The sketch shows a plain piece in position, and of the thickness and width of the raking molding to be obtained. In doing the work first cut the miter on the level molding, after which cut the raking piece or blank to the pitch of the roof and mark this by the cut on the level molding as shown at A. Cut off square the piece near the miter; set it on end and



Sketch of Miter Box Furnished by "J. B."

saw it with a band saw to the mark. Cut a piece as at P from the end and ¼ in. thick for the pattern. This miter, M, has the bevel of a valley jack. The piece of the blank cut off is the bevel of a jack rafter. I would state in this connection that the box should be 12 in. high to cut wide moldings in this miter box.

Novel Method of Making Addition to a House.

From Frank Taflinger, Sidell, Ill.—I have just completed a job of work at Broadlands, Ill., in the way of putting an addition of 6 ft. on a dwelling house. It was a two-story house 24 ft. wide and had a 45-degree pitch roof. After putting up the frame we attached two guy lines to the gable and then loosened it gradually, pinching it out to the distance we wanted it and then joined the cornice sheathing, shingles, &c. In other words, instead of adding directly onto the old gable we detached the latter from the main building and then inserted the addition between it and the gable. Two men and the writer moved the gable out, shingled and fixed up the addition in good shape in less than 18 hr. It was an economical way of doing the job, as it would have been rather expensive to have taken down the gable and rebuilt it. The job was a success in every way.

Proper Use of Raw and Boiled Linseed Oil.

From L. D., San Francisco, Cal.—Will some of the many readers of *Carpentry and Building* who are well informed on the subject of paint and painting please explain the proper use of raw and of boiled linseed oil? I know that each has its special usages, but I have never seen any rules given.

An English Carpenter's Rule.

From R. E. C., Jonesville, Mich.—Where can I obtain a carpenter's rule that reads right end to? All that I have seen have the figures either bottom side up or they read backwards, which I consider very inconvenient and have caused me many mistakes.

Note.—The rule to which our correspondent evidently refers is one having what is known as the "English" markings, the numbers being the same as on the ordinary American rule, but in reverse order. We should suppose that he would be able to get such a rule as he requires from his hardware dealer, as the average store usually carries both kinds in stock.

Laying Out an Octagon.

From Jack Plane, Portland, Ore.—The next time gentle reader you get a new pocket rule take your nail set, if the point is not battered up, and mark the rule on both sides at the 3½ and 8½ in. marks by tapping the side slightly with a hammer. This will leave an indented O, as shown by the heavy black dots in Fig. 1 of the sketches. When you wish to lay out a stick of timber to be worked to an octagon, place the rule diagonally across the stick, the corners even with the edges, as in Fig. 2, then mark at the points indicated by the indented O, or at the 3½ and 8½ in. marks, and you will have the distances by which to gauge the lines for the octagon.

For a larger stick requiring the full length of the rule mark at 7 and 17 in.

For anything larger remember that the side of a square multiplied by 4.97 and divided by 12 will give the side of the inscribed octagon. The figures to use on the steel square for the octagon cut are $4\frac{23}{24}$, or practically 5 and 12.

There are some dozens of ways of laying out the octagon, but the above will be found the most practical and consequently the easiest remembered.

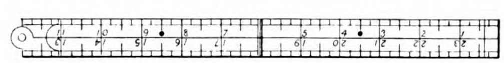


Fig. 1.—Pocket Rule Marked for Laying Out an Octagon.

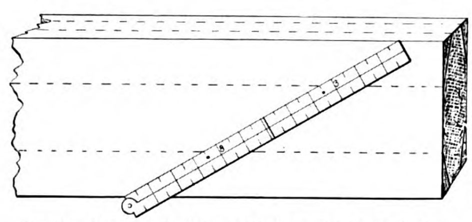


Fig. 2.—Showing Position of Rule on Stick of Timber.

Laying Out an Octagon.—By Jack Plane.

Does Sheathing Aid Destruction of Roof?

From D. D. H., Titusville, Pa.—In answer to the inquiry of "G. W. D.," in the January issue, as to whether the sheathing under a tin roof aids in its destruction, I would say without fear of contradiction that it will destroy a tin roof and that a tin roof should never be put on over paper, nor should it be put on over an old worn out tin roof. The experience which I have gained in 55 years of active service in the sheet metal working business is that the only safe way to put on a flat seam roof is first to exact from the owner or contractor who wants a good tin roof a first-class sheathing, and his consent to allow the use of none but sound, well seasoned boards of even thickness, of either pine or hemlock, and that they shall be tongue and grooved. This sheating must also be well nailed down to the rafters, having the nail heads driven well into the roof boards. Then the sheets of tin, no matter what size or quality, should have a coat of good mineral paint put on the side that is to be laid next to the roofing boards and allowed to dry thoroughly. They may then be laid. Rosin paper, or, in fact, any other kind of paper should not be used under the tin for the reason that when cold weather sets in the roof is liable to sweat underneath. Then the paper absorbs the dampness and wets the plate underneath, holding the dampness between the sheathing and the tin sufficiently long to start rust on the under side of the tin. That is where the trouble comes from with a tin roof that commences to rust out from the under side. No architect should specify the use of paper, and if he does not know better and insists on the paper being used the roofer should object and explain the basis for his objection, as he is the man who will be blamed for poor stock and poor work when leaks in the roof begin to be noticed.

Problems in Roof Framing and Bracing.

From J. F. W., Austin, Texas.—Will some kind reader please give me a solution of the following problems by the use of the steel square? I can solve them by the use of drawings, but cannot work them out satisfactorily with the square.

1. I have a building, as indicated by the roof plan, Fig. 1, the main building being 18 ft. wide, ½ pitch, with an L on the back 24 ft. wide, with ridge the same hight as the front part. I want to know how to find the cut of the hip at the top to fit the ridge on both sides.

2. I have a post which I wish to brace as with a 2 x 4 set at an angle as indicated in Fig. 2 of the sketches. I would like to know the cuts on back and sides at top and bottom.

3. The building in Fig. 1 has lookouts in the gables one-third pitch, and I would like to have some one tell me what are the bottom cuts on the planceer to fit against the shingles on the lookout.

If the practical readers will answer these questions for me, I will offer some others, which may develop an interesting discussion.

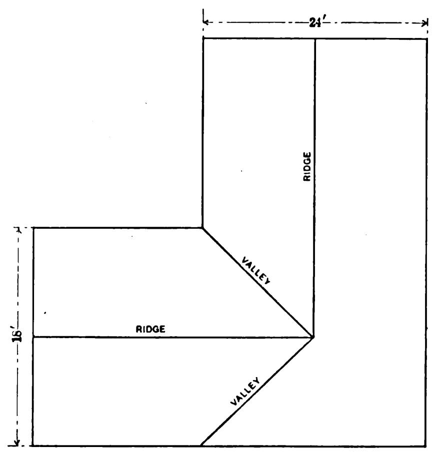


Fig. 1.—Roof Plan.

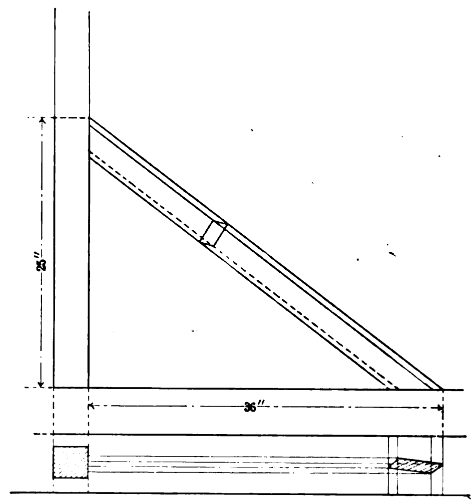


Fig. 2.—Plan and Elevation of Post Bracing.

Problems in Roof Framing and Bracing.—Sketches Accompanying Letter of "J. F. W."

Detailed Estimate of Cost.

From H. A. L., Newark, N. J.—I notice the request of "B. F. K.," Stanstead, Canada, on page 26 of the January issue, and would say that in a general way the so-called "typical estimate" will probably answer his question. The best method, however, for making estimates is to use journal ruled paper and utilize one column for labor and the other for material, then when finished you know what the estimated labor charge will be separate and distinct from the materials.

To an ordinary reader, as well as to the contractor, the item of stonework would appear very much more explicit if the labor and material were separate, so as to show any unusual cost as to labor or to material which would not be quickly recalled. "Front chimney, 17 lineal feet, at $1.35," is very indefinite. As the contractor would be obliged to figure out the brick, lime and sand separately in order to arrive at these figures, it would be just as easy to put down the brick, &c., so that in future the estimate would show what was really done. The way this estimate is made does not indicate whether flue lining was figured or not.

In estimating brick piers and chimney the labor should be kept separate, and it would be little or no trouble to give the size of the piers and chimneys.

Carpenter work would appear on the face of the estimate shown in the January issue to be a mere matter of guess. In preparing estimates I am of the opinion, and it is my experience, that to make an estimate sufficiently clear so that clerks or others can understand how each item was figured requires no more time than to make one that is Greek to everybody except the person who prepared it, and perhaps in a few weeks will be Greek even to him. If the labor was placed beside each item of material there could be no question as to whether it had been included or omitted, and there would be fewer contractors doing business at the present day who are losing money on account of omitting items.

I do not wish to criticise too severely, but as the estimate was given as typical I have endeavored to show, in my opinion, how the typical estimate is lacking. The remarks given above will apply to nearly all items in the estimate.

Note.—Our use of the word "typical" in connection with the estimate presented in the January issue was to indicate that the estimate there given was a fairly typical example of those furnished in connection with our competitions, and was not to be regarded as "standard" or as an example to be followed by prospective contestants.

Information Wanted for Working "Quebacha" Wood.

From S. A. T., Boyne City, Mich.—I have a small problem which I would like to have some of the practical readers solve through the columns of *Carpentry and Building*. I am face to face with a new kind of wood, at least it is new to me, which is called "Quebacha." I am finishing an office building, and one room is finished in this peculiar wood with panel work 5 ft. high. There is a bay window in the room which complicates the work a little. The wood is extremely heavy and hard and has a great tendency to warp and twist,

RESIDENCE OF MR. FRANK H. GAGE, AT PHILLIPS BEACH, SWAMPSCOTT, MASSACHUSETTS

LORING & PHIPPS, ARCHITECTS

Supplement Carpentry and Building, February, 1909

[For plans see page 55]

more especially under the influence of steam heat, by which the rooms are heated.

This lumber grows in South America and is principally used for making tanning extracts.

If there are any "brother chips" who have had experience with this kind of wood and can give me any advice as to how to treat it and work it to make a satisfactory job, I shall appreciate it.

A Question in Carpentry.

From C. H. M., St. Johns, Newfoundland.—Some time ago I was employed to make the detailed drawings of interior finish for doors and windows, the style of which was something after the Doric, as shown in Fig. 1 of the accompanying sketches. When I had the sections drawn, which were exactly as shown in Fig. 2, the person for whom I did the work objected thereto because there were no "grounds" shown under the pilasters on the outside next the plastered wall. What I mean will be made clear by a glance at Fig. 3. I contended that "grounds" in such a place would be meaningless and out of order; that "grounds" were in no way a part of the work, and that they should never be used in connection with such work only on the outside of wooden houses where they were required to "stop" clapboards, shingles or other weatherboarding against them. Even then they were to be considered not as part of the Order under treatment but as part of the face of the wall upon which the Order was set. My contentions, however, were of no avail, as the other man being the boss felt that he was right, so the work was followed out as indicated in Figs. 3 and 4 of the sketches.

Now, the question I want to ask the readers of the Correspondence columns of *Carpentry and Building* is this: Which is right, the way I laid out the work in the first place, as shown in Fig. 1, or the other way, shown in Figs. 3 and 4? I know there are a great many readers of the paper who are most competent to give satisfactory answers, and I would like to have the opinions of as many of them as possible, as the questions may be interesting to others besides myself.

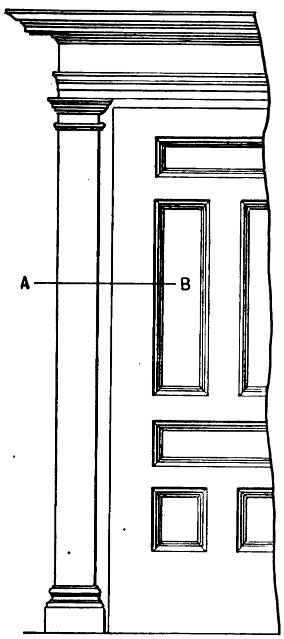


Fig. 1.—Partial Elevation of Door Trim.

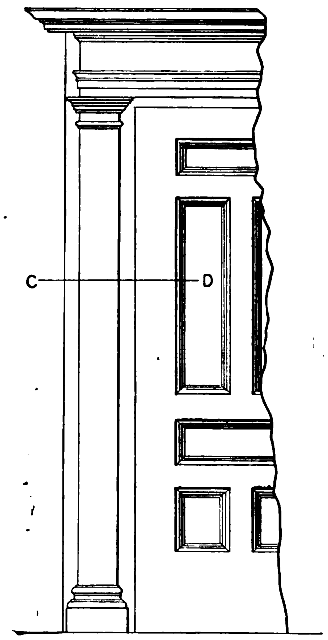


Fig. 3.—Partial Elevation Showing "Grounds" Under Pilaster Next to Plastered Wall.

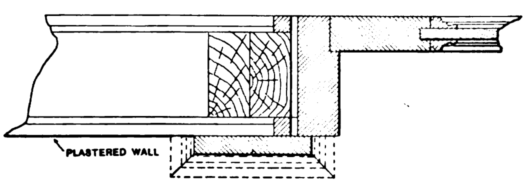


Fig. 2.—Section on Line A—B of Fig. 1.

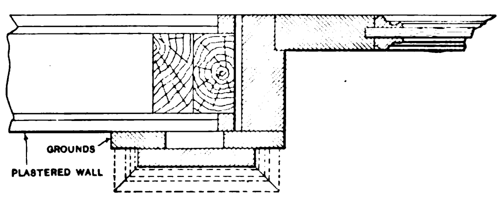


Fig. 4.—Section on Line C—D of Fig. 3.

A Question in Carpentry.—Contributed by "C. J. M."

Tables of Board Measure Wanted.

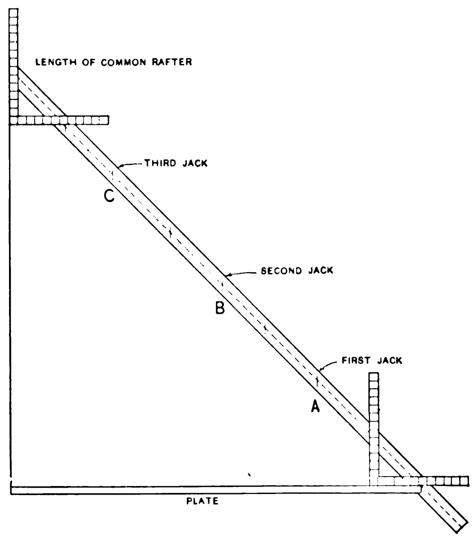
From L. K. L., San Francisco, Cal.—Will some practical reader who is expert in this line compile a table of board measure for publication in the Correspondence columns which will give the number of feet in material 1¼ in. and 1½ in. thick, together with information ordinarily presented in connection with tables of this kind. The tables as usually published in book form give the number of feet in stuff of even thickness, such as 1 in., 2 in., 3 in., 4 in., &c., but never in thicknesses of 1¼ in., 1½ in., &c., neither do the tables start with short lengths, say from 3 ft. upward.

In figuring stairwork, for example, the treads are of 1¼ or 1½ in. stuff and from 3 ft. and upwards, while the stringers are usually 1¼ in. thick. This new table would save a lot of work in figuring stairs and in other cases, as for example, when it is desired to find the amount of material in a small door (glass) 18 in. by 2 ft. by 1¼ in. thick having three stiles. There are two uprights of 2 ft. each, which makes 4 ft., and two cross pieces each 18 in. equals 3 ft., thus there is a total of 4 + 3 = 7 lineal feet of 1¼ x 3 in. stuff required. By referring to the table in question one would have the exact amount of board measure necessary.

I am sure a table like this will be appreciated by many of the readers as well as myself. I am well aware of the fact that by using the tables in current use one might obtain the amount contained in 1¼ and 1½ in. material by adding or subtracting, but this takes time and besides one might make a mistake, so the table would be much better.

Finding Length of Rafter.

From F. S., Hermitage, Tenn.—Answering the inquiry of "W. H. J. P." of Philadelphia, Pa., which appeared on page 334 of the October number of *Carpentry and Building,* I am sending a sketch with the steel square shown in position for finding the lengths and cuts of rafters of any pitch or any width of building, including hips, valleys and jacks. The dotted line, as indicated on the sketch, is called the "work line," and all lengths are taken from it. It is of the greatest importance, and in cutting jacks, hips and valleys, braces of any kind, steps and strings for stairs, the same rule holds good.



Finding Length of Rafter.—Sketch Accompanying Letter of "F. S."

Referring now to the accompanying sketch with the steel square shown in position, for a half pitch roof, place the square on the work line with the 12-in. mark on the blade and the 12-in. mark on the tongue, all as shown. This gives the top and bottom cuts. Now mark for the bottom cut at the plate and move the square along the rafter, holding it with the 12 and 12 in. marks exactly on the work line until it has been moved eight times for a 16-ft. room; or in other words, as many times as there are feet in half the width of the house.

For jacks on 2-ft. centers move the square two times for the first jack, four times for the second jack and six times for the third jack, as indicated by the points A B C. For the hips or valleys for half pitch roof take 17 in. on the blade of the square and 12 in. on the tongue; 17 will cut the angle fitting the plate and 12 will fit the top. To get the length move the square as many times as in getting the length of the common rafter—eight times for 16-ft. room or half as many times as there are feet in the width of the house.

For one-third pitch roof take 8 and 12 in. on the square; for one-quarter pitch take 6 and 12 and move the square along the rafter as above described, holding the figures on the square exactly on the work line. The top and bottom cuts of jack rafters are the same as those of the common rafter.

In laying out hips and valleys the only change in position of the square is that of the bottom cut, when 17 takes the place of the 12. Hold the same figures at the top of the hip as were used in cutting the common rafter. The length is obtained in the same manner as that of the common rafter.

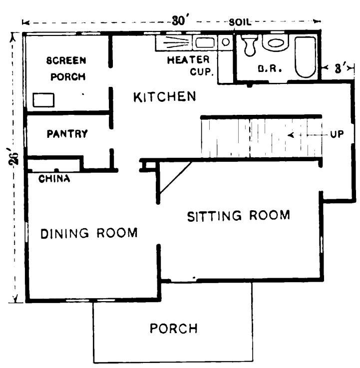
I would advise those who do not fully understand roof framing to purchase a copy of "Hicks' Builders Guide," sold by the publishers of *Carpentry and Building.* If the correspondent will get a copy and study it for 12 months and practice all that he has learned in that time, he will be able to frame any roof that he desires. I have used this little book as a guide for 12 years, and it has saved me much time and money; in addition it is a consolation to me to have a good understanding of roof framing.

"Brailing" a Flag.

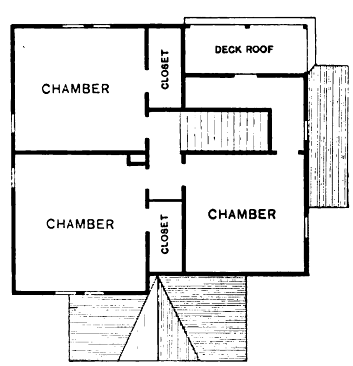
From F. M. G., Salt Lake, Utah.—Will some of the brothers please tell me how to "brail" a flag? There is a way of rolling a flag up so that when hoisted to position on the mast a pull of the lanyard "breaks" it out to the breeze. I think it is used aboard ship, but have never met any one who could describe how it is done.

Developing the Plans for Workingman's Home.

From A. T., Pasadena, Cal.—I inclose floor plans for a laboring man's home, which may possibly be of interest. I would like to have some of the readers develop them and make suggestions. My idea is a one and one-half story building, with 14-ft. studding and four gables. The soil pipe would come up through and on to the deck roof, then into the second floor closet. It is not necessary to guard against freezing here. The fuel for cooking would be gas. There should be plenty of good size windows, and if a cellar is provided the entrance should be outside, near the rear screen door. I would like to see published attractive elevations, not too expensive, and would be glad to have readers suggest any



First Floor.



Second Floor.

*Developing the Plans for a **Workingman's Home.—Scale,*** 1-16 *In. to the Foot.*

changes that would not add materially to the cost.

I have been a reader of *Carpentry and Building* for many years, which shows the value of the paper to me.

Why the Fireplace Smokes.

From W. W. de Veaux, North Yakima, Wash.—If the drawing of "F. B." in the December issue is correct, I think a glance would show the cause of his fireplace smoking. The inclined back does not run high enough above the top line of the opening of the fireplace, consequently the smoke striking against the inclined back curls out into the room. Another cause is that just above the throat the down draft from the flue is not broken, but slides down the incline, helping to draw the smoke out. In my opinion the throat is needlessly large, as a little more than the area of the flue is necessary. The area of the flue should be about one-fifteenth the area in square inches of the fireplace opening. All details are drawn on these principles by me, and I have never yet had the question of a smoky fireplace arise. The sketch, Fig. 1, represents what in my opinion is a correct throat section.

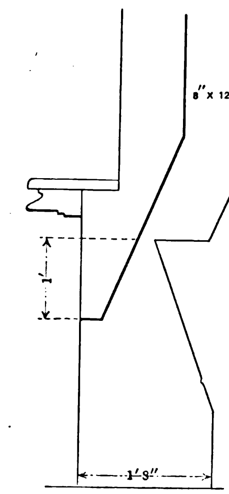


Fig. 1.—Sketch Submitted by W. W. de Veaux.

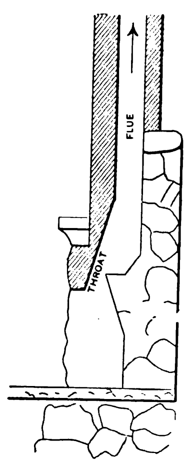


Fig. 2.—Sketch Accompanying Letter of Mr. Sedille.

Why the Fireplace Smokes.

From Eugene E. Sedille, Architect, Newark, N. J.—In reply to the inquiry of a correspondent in the December issue of the paper relative to his fireplace smoking, I would say that a very simple rule to be applied in the designing of chimneys so that they will draw is as follows: For every square foot of opening allow 13 sq. in. opening in the throat.

In this case an opening 24 in. long and 3¾ in. wide will meet the requirements. I am sending a rough sketch, Fig. 2, representing a vertical section through a fireplace and chimney indicating the shape of the throat flue.

From F. B. E., Bennington, Vt.—I would say in answer to "F. B.," whose inquiry appeared in the December issue, that the opening of the fireplace is too high. If instead of 2 ft. 9 in. he will cut the hight down to say 2 ft. 4 in., I think it will help the situation materially. He can put a board or piece of sheet iron over it to test it. Now it is so high that the air passes over the fire and breaks the current from it. Above the throat the flue should be enlarged, so that the smoke can expand; that is, just above the throat there should be a ledge straight back and similar to A B in the diagram marked Fig. 1 in the January issue of the paper.

From W. A. W., Cuyahoga Falls, Ohio.—Regarding the inquiry of "F. B.," Bolton Landing, N. Y., he states that the flue of his chimney is 8 x 12 in., which equals 96 sq. in. of area. The throat is 2 ft. 6 in. by 5 in., or 150 sq. in. Now it will be readily seen that there are 150 sq. in. of area trying to go through an opening having 96 sq. in. With a flue having a cross section of 96 sq. in. the throat should be at least from 85 to 90 sq. in. in cross section. That would make the flue pull hard through the throat and give a better draft.

Again, the fire back should not start to be drawn over until half way up the fireplace, and then should draw gradually to a point about 7 in. above the top of the fireplace opening, that gives the smoke a chance to get well past the opening before being choked. The chimney should be at least 12 in. above the highest ridge of the house, and the correspondent should be sure a lot of mortar may not have fallen down the chimney and stopped up the flue just above the throat.

From F. T., Sidell, Ill.—I think if "F. B." will build his chimney about 2 ft. or more above the ridge of his house he will have no trouble with the fireplace smoking. In my estimation the size of the room could not possibly have anything to do with his trouble. I have had the same experience with a stove flue, and often remedied the difficulty by extending the chimney to a greater hight.

The Value of Trade Catalogues.

From Jack Plane, Portland, Ore.—How few mechanics there are who realize the benefit they may derive from a study of the ordinary commercial catalogues devoted to the tools, appliances, &c., in which they are directly or indirectly interested. Primarily the mission of an advertising circular or catalogue is to sell goods, but aside from this aspect of the matter they have a value that is but rarely understood and seldom appreciated. A good workman must know his tools. He not only must know them but he should also keep himself well informed on each new tool or appliance that is introduced for use in his particular line of work.

In the larger cities frequent inspection of the hardware show windows will give one a pretty good idea of what is new, but in the vast majority of cases a man would never be able to keep up with the times in that respect if he had to rely on the hardware dealer—especially the younger generation of dealers and clerks. It used to be that the average man behind the counter was thoroughly informed as to the relative practical value of his goods, and often gave valuable advice to the amateur and apprentice; but it seems to me that sort is passing rapidly. Nowadays the young salesman's knowledge does not extend much further than the stock number, selling price and baseball score. Of course, some of the articles brought out from time to time are of but little or no practical value, but preferences differ in this as in many other things, and what will help one may not help another.

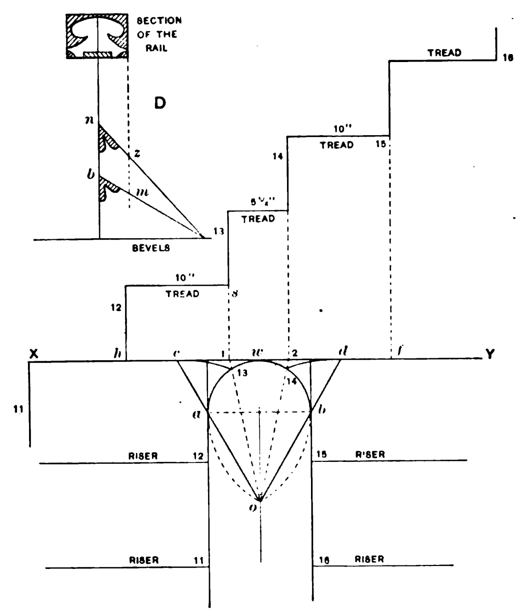
I would advise every apprentice to make it a point to send for the different catalogues and study them carefully. Look over the advertising pages in *Carpentry and Building* and you will find a number of firms who will be glad to furnish you a book or circular describing their goods. It may seem a queer source from which to obtain information, but just try it and you will, I am sure, be well repaid. Such knowledge will be of great advantage to you when you wish to make a selection from a number of apparently similar tools placed before you. Too many fail to discriminate in buying—they too often accept the first thing handed out.

In addition to the value of the descriptive advertising matter to which I have referred above, there is scarcely a tool catalogue but what contains some special tables, rules, methods, &c., that are extremely useful and in many cases cannot be found in any text book published. In some of them are to be found practical instructions that will be of continual service and for which one would have to wait a long time if he depended on learning from the average craftsman. For example, how many carpenters are there to-day who can explain the various markings on a steel square? Don't hesitate. Speak up, brethren!

Determining Lengths of Treads in Stair Construction.

From G. H. G., Philadelphia, Pa.—As I am very much interested in the laying out of stair work I have noted with deep attention the articles on this subject now appearing in *Carpentry and Building*, by Morris Williams, and have been following them very closely, giving them considerable study. Being a little shady on this particular branch of work I have found the articles of great benefit to me, but I must confess I cannot follow Mr. Williams all the way, so I am writing to ask if it would be possible for him to clear up a few points which trouble me, and which I will set forth in this letter. If Mr. Williams can find it convenient to grant such a favor it will be a great help to me and I will thank him for the trouble.

The first point I would like to have made clear is in reference to Fig. 23, page 394, in the December issue. What determines the length of line of tread from *s* to 12 and from 14 to 15? It appears to me that it should be more than 10 in.—the width of a tread—because it will take more than 10 in. to reach from riser 12 through



Determining Lengths of Treads in Stair Construction.

the point *a* to 13 on the semicircular plan. It, therefore, appears to me that from 12 to *s* on the pattern should be more than 10 in. The same thing applies to 14 and 15.

Am I right or wrong, and if wrong will Mr. Williams kindly put me right?

Also will he state how the points 14 and 15 on the semicircular plan are determined.

Also how his distances from *b* to *m* and from *n* to *z* are determined in the diagram D placed just above Fig. 25 on the same page of the same issue.

Answer.—The letter of the correspondent above was referred to Morris Williams, who furnishes the following in reply to the points raised. In the accompanying diagram I have reproduced the plan of Fig. 23, page 394 of the December issue, in order to show the correspondent "G. H. G." how to determine the length of the line of tread from *s* to 12 and from 14 to 15. With a 5-in. radius, draw the semicircle as shown by *a w b*. With *a* as center, and with radius *a b* describe the arc from *b* to *o*. Again with *b* as center and a radius equal to *b a*, describe the arc from *a* to *o*. From *o* draw a line through *b* and continue it to *d;* draw another from *o* through *a* and extend it to *c* The distance *c d* on the straight line X Y will be the stretchout of the semicircular plan curve as shown by *a w b*.

From *d* to *f* measure the same distance as from *b* to the fifteenth riser, which is equal to 5 in. Measure also from *c* to *h* a distance equal to that from *a* to the twelfth riser on the opposite side of the cylinder. This distance will also be 5 in. In this manner we have found the total stretchout of the stringer from the twelfth riser to *a* and around the cylinder to *b*, as well as from *b* to the fifteenth riser, all as shown on X Y from *h* to *f*.

The perpendicular line upon *h* represents the face of the twelfth riser and the perpendicular line upon *f* the face of the fifteenth riser. Between these two lines will be found those of the thirteenth and fourteenth risers, which are contained in the cylinder.

Now to ascertain "what determines the length of the line of tread from 12 to *s* and from 15 to 14," as required by the correspondent, we measure 10 in. from 15 to 14 and drop a line to the point 2; also the distance of 10 in. is measured from 12 to *s* and a line dropped to 1. Now from 1 draw a line to *o*, cutting the cylinder curve in the point 13; also from 2 draw a line to *o*, cutting the cylinder curve in the point 14, thus determining the location of risers 13 and 14 upon the curve plan of the cylinder. From these points draw a graceful curve, as shown, to *d* and to *c*, respectively.

The correspondent further says: "It appears to me that the treads from *s* to 12 and from 14 to 15 should be more than 10 in., because it will take more than 10 in. to reach from riser 12 through *a* to 13 on the semicircular plan." This is a mistake on his part, as it takes exactly 10 in., because the length of the curve from *a* to 13 is 5 in. when stretched out as shown on X Y from *c* to 1. Adding to this the distance of 5 in. measured from 12 to *a*, we get a total of exactly 10 in. from 12 through *a* to 13, and the same on the other side of the cylinder from 15 through *b* to 14.

In diagram D is shown how the distances from *b* to *m* and from *n* to *z* on the long sides of the bevels are determined. Above the bevels is a cross section of the rail. A line from one side of it is dropped to cut the bevels in *z* and *m*, showing that the distance from these lines to the perpendicular line of the bevels is equal to half the width of the rail; hence the hypotenuse of the bevels between these two lines will indicate half the width of the face mold at the ends where the bevels are to be applied.

I would state in this connection that any further information desired by this or any other correspondent on the subject of stairbuilding or anything pertaining thereto, as they appear in the future issues of the paper, will be gladly furnished through the columns upon request.

Cellar Damp and Smells Musty.

From A. & S., Binghamton, N. Y.—Having read the letter of "W. L. C." in the January issue, I feel sure that all he wants is air and sunshine to change the condition which he complains of in his cellar—evidently the cellar is cool. This induces the condensation upon the cool surfaces of the cellar walls of the moisture which the air carries. This is not necessarily an objection, and will attend the opening of the windows for ventilating purposes. If the cellar is thoroughly cleaned and whitewashed periodically it will have a freshening and sweetening effect. In the cold season the opening of the cellar windows might be objectionable through making the floors cool. If the opening in some chimney is left to draw the air out of the cellar, sufficient air will go in to ventilate the cellar and avoid the musty odor and complaint about it. I would recommend that the cellar be swept out, cleaned and dusted, then as carefully whitewashed, and believe this will go a long ways to remove the objectionable conditions of which complaint is made.

Building on the Percentage Basis.

From F. T., Sidell, Ill.—I would like to hear from some of the craft who have executel work on the percentage plan. This subject, I believe, has come up before, but I do not think it was ever explained, at least not to my satisfaction.

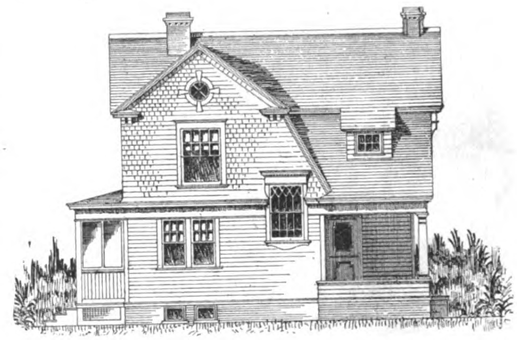
DESIGN FOR A LOW COST DWELLING.

HOUSES of moderate cost have always been popular with a large class among our readers, and we take pleasure in presenting to their attention at this time a design which shows a compact arrangement of rooms, and with elevations which, while in no sense elaborate, make a rather pleasing building. It will be observed from an inspection of the plans that the cellar has been arranged with a view to a furnace in the future, and that upon the first floor are three main rooms with a reception hall, and upon the second floor are four sleeping rooms with bath room.

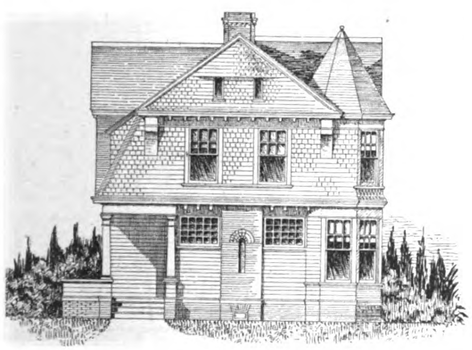
According to the specifications of the architect, the foundation walls and chimneys are of well burned brick laid in strong gray lime mortar. In the hall nook is a floor of red pressed brick in red cement mortar resting upon a foundation of three inches of cement concrete. All framing lumber is of spruce, the stiles being 6 x 6 in.; the girders 6 x 10 and 8 x 10 in.; the first and second story joist 2 x 10 in., placed 16 in. on centers; the attic joist 2 x 8 in., and the studs and rafters 2 x 4 in. The exterior frame is covered with ⅞-in. spruce boards laid diagonally, on which is placed red rosin sized building paper, this in turn being covered at the first story with lap siding exposed 4½ in. to the weather, while the second story walls and gables are covered with 6-in. cedar shingles, having square butts and exposed 5½ in. to the weather. The roof is covered with cedar shingles laid 4¾ in. to the weather. All outside trim, cornices, water table, &c., are of sound white pine. The posts of the front porch are of red wood 9 in. in diameter and turned hollow. The floor is of ⅞ x 3 in. quartered "Texas," while the ceiling is of ⅝ in. beaded stuff.

The front door is of white pine veneered on the inside with selected Texas, the upper panel being glazed with oil, the siding being of light colonial yellow and all trim cream white. The shingles on the walls and gables are left natural, while the roof has two coats of moss green Cabot's stain. The finish in the hall is yellow pine, and in the parlor and dining room stained oak. The kitchen and pantry wood work has two coats of Spar varnish, and the second story three coats lead and oil. The kitchen and hall floors have two coats of floor varnish.

The cottage here shown was designed by Architect E. R. Rice, 430 Seventeenth Street, Denver, Colo.



West Side (Left) Elevation.



Front Elevation.

East Side (Right) Elevation.

Design for a Low Cost Dwelling.—Architect E. R. Rice, Denver, Colo.

Chambers sheet glass. The floors in the first story rooms are ⅞ x 4 in. quartered Texas, and the balance are of Texas star, all laid tight and blind nailed.

The finish of the main rooms is with ⅞ x 4 in. molded casings with band mold, ⅞ x 8 in. molded base, and 1⅛ in. stools to windows with aprons. The opening between the hall and the nook has paneled pedestals with turned columns. The kitchen and the second story are finished with ⅞ x 5 in. casings, mitered. The kitchen and bath room are wainscoted 3 ft. high.

In the kitchen is a 40 gal. galvanized iron boiler and a 20 x 30 in. enameled iron sink with hot and cold water connections. In the bath room is a syphon jet water closet with oak seat and tank and nickeled brass flush and supply; also a 5½ ft. roll rim enameled iron tub with combination cocks, and a 14 x 17 in. bowl with 20 x 30 in. marble slab and 8 in. back. All traps are vented with galvanized iron piping of the proper size, the soil pipe being 4-in. extra heavy. The house is piped for gas in accordance with the rules of the local gas company. All exterior surfaced woodwork has two coats of lead and

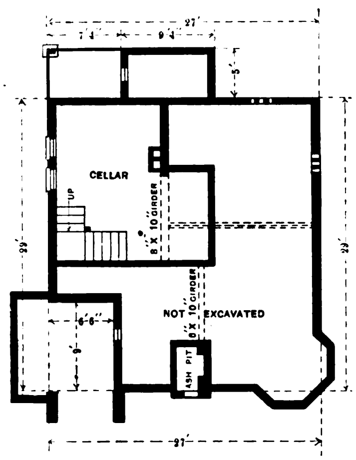
Lighting and Ventilation of School Rooms.

The subject indicated by the above title is one of prime interest to architects and builders in every section of the country, as upon the proper lighting and ventilation of school rooms depend the health and comfort of the pupils. Some very pertinent comments upon the topic are found in a paper read by Sir Aston Wapp at the second International Congress on School Hygiene, and from which we glean the following points:

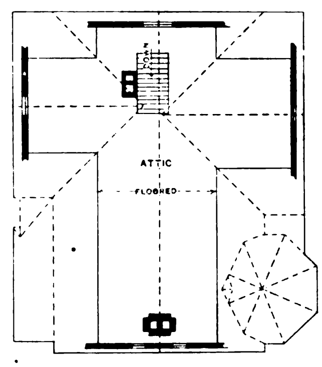
The size of classrooms is obviously closely related to the subject of lighting, and is necessarily regulated by the size of the classes which may vary from the 50 or 60 scholars or more allowed in a public elementary school to the 15 or 30 in a secondary school. The size is also regulated by the seating arrangements adopted, the width of gangways and master's platform being important factors. The Board of Education lays down an average of not less than 10 sq. ft. of floor space for each scholar in public elementary schools, and in this country (England) this is generally adhered to, while in secondary schools where single desks are used a floor area of from 17 to 18 sq. ft. is required, although under certain circumstances a minimum allowance of 16 sq. ft. will now be accepted. The nearer a room approaches a square the better it may be lighted and ventilated, with the limitation, however, that a room can hardly be satisfactorily lighted if more than 24 ft. wide, while 22 ft. is better.

We will assume that the room is lighted, as it should be, from one side only, which at once limits the depth from 20 to 24 ft. The length will then depend upon the number to be seated. The hight of the room is also an important factor in the lighting, as the deeper the room the higher it should be if the seats farthest from the window are to be properly lighted. For the purpose of acoustics and ventilation 12 ft. is generally a sufficient hight, though if a large number are to be accommodated 13 to 14 ft. in hight may be necessary. These regulations work out for a classroom in a secondary school for 25 scholars at 23 ft. 6 in. by 19 ft. by 12 ft. high.

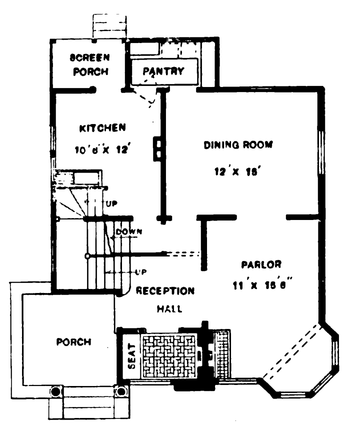
Having settled the size of the classroom, the question of lighting has to be considered more in detail. It seems hardly necessary to mention that it should be lighted from the left hand of the scholar only. The size of glass area will be affected by two considerations, the aspect and the situation. Classrooms should be so placed that they have the sun in them part of the day, but not always; therefore north, west and southwest if unprotected, should be avoided. The Board of Education lays down one-fifth as the approximate area of window glass to the floor area to satisfactorily light a classroom. In very confined sites, however, one-fourth is sometimes found necessary, and in open and exposed sites one-sixth will sometimes suffice. Anything beyond the amount of glass actually necessary to give a satisfactory light is undesirable, as it tends to make the room cold in winter and hot in summer, while adding considerably to the difficulty of the effective treatment of the room, both externally and internally.



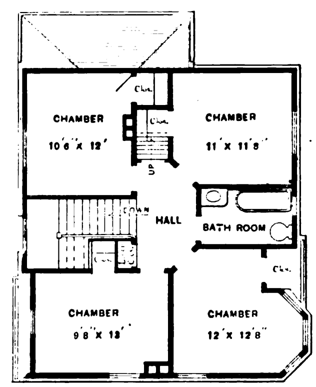
Foundation.



Attic and Roof.



First Floor.



Second Floor.

Design for a Low Cost Dwelling.—Floor Plans.—Scale, 1-16 In. to the Foot.

The glass line should not be more than 4 ft. above the floor, with the heads of the windows carried up as near the ceiling as possible. The windows should be so arranged in the wall that all sides are equally well lighted. This is apt to leave the master's desk somewhat under-lighted, and in order to rectify this a small window is sometimes provided to light the master's desk, it being kept low down so that he can also see out of it.

Under no circumstances should there be windows facing the scholars, and windows in the opposite wall facing the master are almost equally objectionable. Mullions, transoms and window bars are in my opinion unobjectionable if the glass area is calculated independently of them. Plain sheet or plate glass is the best for glazing, and the view of the sky should not be shut out from the scholars.

Glazed brick or tile walls, except as dadoes, are not suitable for classrooms of the character we are considering, as the reflected light is trying to the eyes, and being nonporous the materials are not considered hygienic for crowded rooms. A white plaster ceiling is the best, with light green or gray walls, according to aspect, the woodwork painted white, or better still, left its natural color. A glare in a classroom is to be as carefully avoided as gloom.

The artificial lighting of classrooms is of equal importance where much evening work is done. Carefully regulated incandescent electric lighting is the best and greatly simplifies the ventilation. Gas is better avoided. Perhaps the best illuminant is composed of inverted arc lights with the room lighted by reflection from the ceiling, but it is extravagant in current. Single incandescent lamps equally distributed over the ceiling give a pleasing and well diffused light. Groups of lamps in electroliers should be avoided in classrooms. One 8-candle lamp if not hung too high should light sufficiently 24 ft. of superficial floor area.

For the ventilation of classrooms it is more difficult to lay down any definite rules. The problem may be simply stated as follows:

The time required to contaminate the air in a classroom of an elementary school of the capacity required, per scholar; that is, 10 ft. per pupil, is 8 minutes, while for that of a secondary school it would be a quarter of an hour. The temperature of the room, according to the rules of the Board of Education, has to be kept at from 56 degrees to 60 degrees F. The problem therefore is how to change the air of a classroom from four to eight times an hour and at the same time to avoid drafts and keep the temperature at the range of degrees stated.

In discussing ventilation, it is not possible to exclude altogether the question of heating. This can be done by open fireplaces, hot water or steam and warm air. There is, I think, in England a strong preference for the open fireplace and the open window, and no doubt there is much to be said for them, especially in small schools; in larger ones they are impracticable. The open fireplace not only provides heat but also a means of ventilation, and should be placed in the angle on the inner wall near the door, not on the window side, which is an outside wall. If extraction is adopted probably the best plant is hot water radiators under the windows fitted with bafflers behind which fresh air admitted from outside is warmed by passing over the radiators and the foul air is mechanically extracted at the ceiling level in the wall opposite. By this means and with reflectors on the inlets and outlets the system can be sufficiently regulated, but it is as well also to supply an open fireplace, though mechanical extract may interfere with its draft at times. The size of both the inlet and outlet depends upon the power of the fan employed.

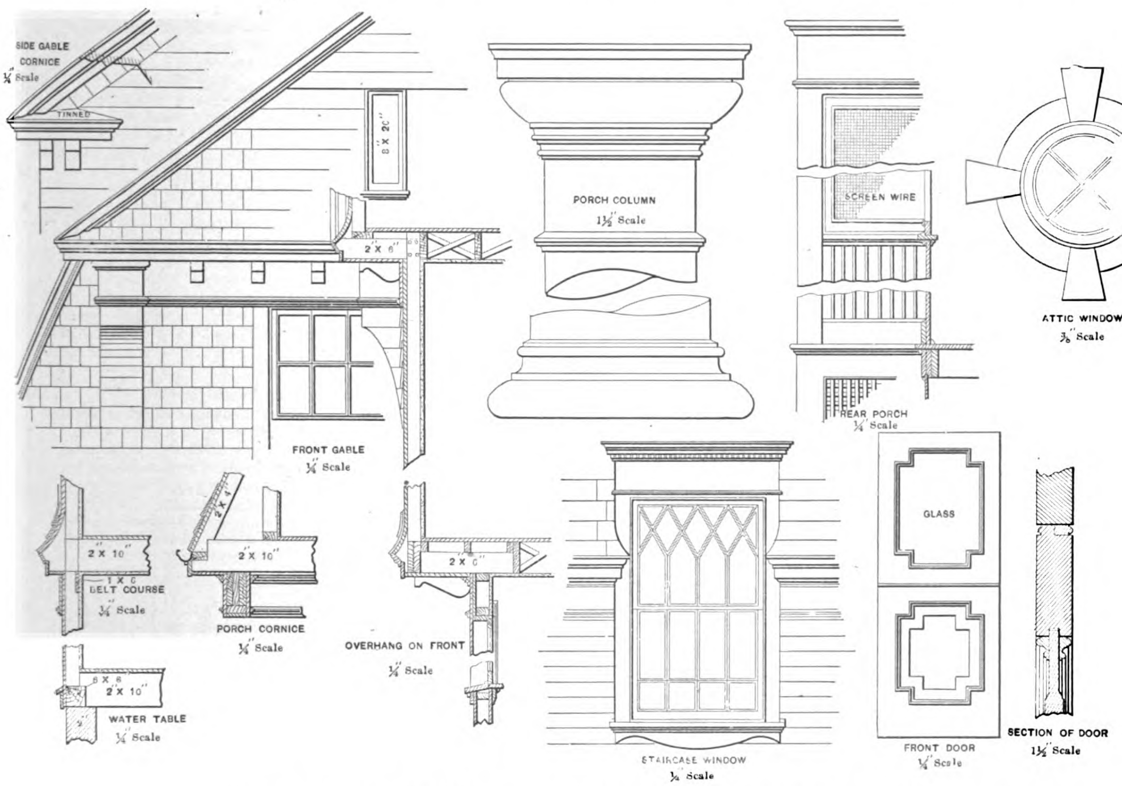
The alternative is the propulsion of warm air into the room by a fan, the air being admitted into the room about 2 ft. below the ceiling, the outlet being at the floor level into the corridor immediately below the inlet over. The advantages of this system are the more equal distribution of the heat throughout the room, the absence of all heating apparatus, suuch as radiators in the room, the avoidance of draft, and the ease with which the apparatus can be used for ventilation purposes in summer time. The system, however, requires to be planned with the building, as it cannot be applied to old structures.

Painting Over Cement.

It is never advisable to paint over a cement surface. If it becomes necessary, however, delay the operation until it has stood exposed to the elements for about 15 months, unless the surface has first been sized with acid water to kill the alkali, but even then there is danger of bad results, says a writer in an English exchange.

The following method of preparing and painting such surfaces, it is said, has received the sanction of some of the best painters in the country:

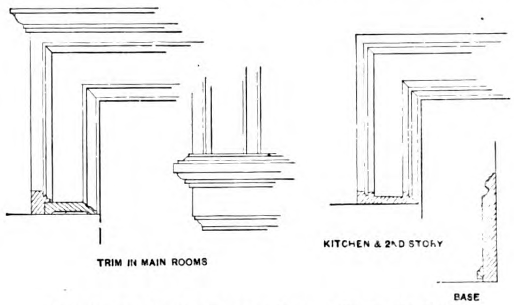
Slake ½ bushel of fresh stone lime in a barrel and add in all 25 gal. of water; when slaked and cold, add 6 gal. of the best cider vinegar and 5 lb. of best dry venetian red. Mix well, and then strain through a fine wire strainer. Use it when about the consistency of thin cream. Give the cement surface a coat of this, and after standing a day or so apply a coat of red lead and linseed oil paint. After this has dried you may paint the surface any color you wish. Some jobs require two coats of paint over the red lead paint. In this case make the second coat of paint serve as filler and paint both. This second coat may be made with plaster of paris and oil of the consistency of buttermilk. Then break up some white lead and oil to make a paint the same consistency as the plaster paint. Now take equal parts of each of the two mixtures and "box" them together, and thin to a working consistency with turpentine. This second coat should be applied as heavy as possible, or as heavy as you can spread it well. After this coat is dry apply your next and finishing coat of paint, which should be quite glossy, or about as you would for the last coat on woodwork outside. The object in giving it this plaster paint is to prevent the running and wrinkling of the paint where considerable paint is to be applied to the surface. And it must be made to dry quickly.



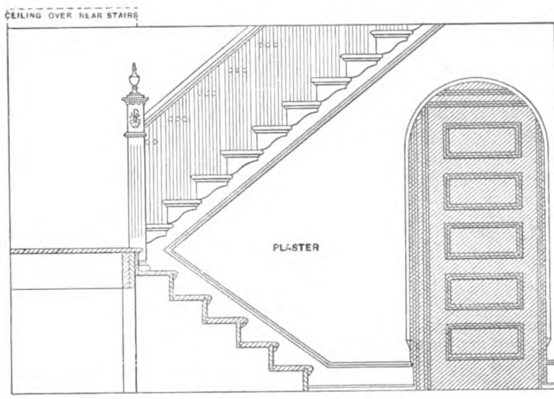
Design for a Low Cost Dwelling.—Miscellaneous Constructive Exterior Details.

Brick versus Stone.

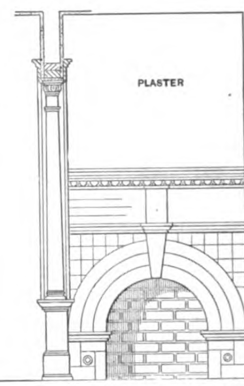
We often hear the statement that all bricks are alike, and that almost any brick is fit to use in a building if properly laid. It is, however, never safe to assume that a brick is enduring and suitable for building operations unless we know its composition, says a writer in an exchange. The most potent factor which must be guarded against is the presence of salts of magnesia. It is only a question of time when bricks in which these salts are present in any appreciable quantity will be badly influenced by the weather, and we have seen bricks which, when fresh from the kiln, gave every mechanical evidence of being of best quality so shattered and disintegrated by the combined effect of moisture, frost and the chemical action of the magnesia, that a knife could be thrust straight into them with very little effort. Fortunately there is so much good clay in this country and so many thoroughly reliable brick manuacturers, that there is really no excuse for bad bricks ever being used, but any brick is not necessarily a good brick, and as much care and intelligent discretion must be used in the employment of this material as in connection with any building medium. There is a common conception that granite is one of the most enduring stones, but as a matter of fact most granite would be outlived by thoroughly first quality hard burned brick. A pure syenite, free from iron or mica, constitutes the most enduring of the granites. A granite quarry may have good stone in some portions of the deposit and be utterly worthless in others, and as a general rule it is not safe to use a granite unless the architect knows absolutely its composition and the part of the quarry from which it is taken. Sandstone is really a bad building material. The cementing material in sandstone has a very slight value, and it is probably the poorest material extensively used, as far as resisting the action of frost is concerned, while the presence of iron constitutes an almost fatal defect. It may be said also that very little sandstone is free from iron.



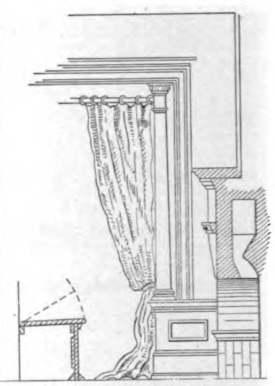
Details of Interior Finish.—Scale, 1 In. to the Foot.



Section and Elevation of Main Staircase.

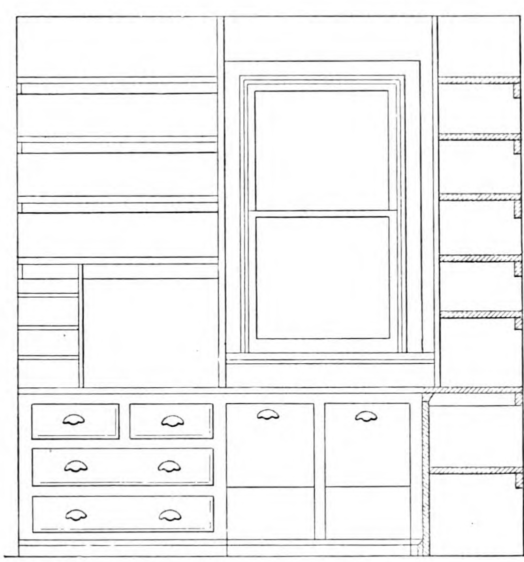


Elevation of Hall Mantel.

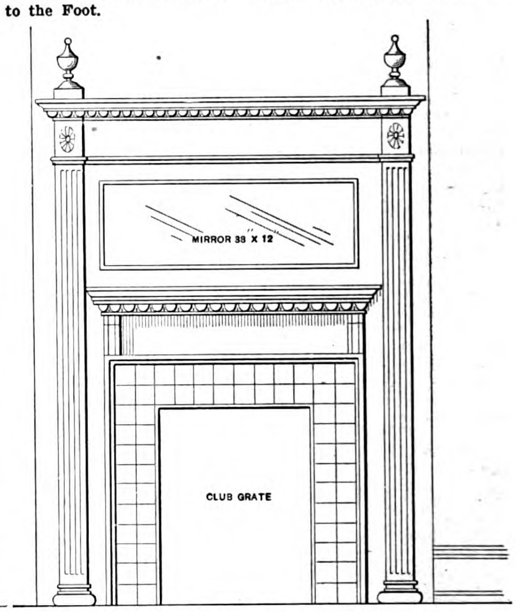


" Nook," Looking Toward the Hall.

—Scale, ¼ In. to the Foot.



Details of Pantry Finish.—Scale, ⅜ In. to the Foot.



Elevation of Parlor Mantel.—Scale, ½ In. to the Foot.

Miscellaneous Constructive Details of Design for a Low Cost Dwelling.

WHAT BUILDERS ARE DOING.

REPORTS of building operations in the leading cities of the country during the year just closed indicate that notwithstanding the severe business depression the value of the operations was only about 10 per cent. less than in 1907. A noticeable feature of the new work was the number of dwellings of an inexpensive character, and with comparatively few exceptions the absence of what might be designated as notable "individual undertakings," involving large capital in their execution. The feeling at present among architects and builders is for increased activity as soon as the spring season opens and a volume of business during 1909 which will give employment to mechanics in every branch of the industry.

Atlanta, Ga.

An interesting feature of the local building situation is that the office of inspector of buildings, Ed. R. Hays, issued permits for more work in the first two days of 1909 than it did during the first two weeks of the year before. The outlook for building is good, and the tendency of prices of building materials is toward a somewhat higher level. In December there were 228 permits issued for new building work estimated to cost $170,822, and in December, 1907, there were 188 permits taken out for improvements costing $126,360. For the 12 months of the year just closed 4153 permits were issued by the inspector of buildings for work estimated to cost $4,833,941. These figures compare with 4169 permits for building improvements involving an outlay of $4,554,771 in the 12 months of 1907.

On the evening of January 8 the members of the Builders' Exchange gave a "spread" at their quarters in the Prudential Building, which was a highly successful affair. A number of invitations had been extended to prominent business men of the city, architects, contractors, &c., and after the good things provided had been duly considered brief addresses were made by several of the members and guests.

Buffalo, N. Y.

A decrease of about 19 per cent. in the estimated cost of building construction in 1908, as compared with 1907 is given in the figures of Henry Rumrill, Jr., deputy building commissioner. In 1908 permits for 2788 buildings were issued at an estimated cost of $6,847,000. In 1907 3039 permits were issued at an estimated cost of $8,411,000.

During the month of December the commissioner issued 193 permits for improvements costing $629,000, while in December, 1907, there were 159 permits issued for new work, alterations and repairs involving an estimated outlay of $439,600.

The present building outlook seems very encouraging, as building materials are considerably lower than heretofore and seem likely to remain so for some time. Much, however, will depend upon developments later in the season when building operations are under greater headway.

Cincinnati, Ohio.

Notwithstanding 1908 represented one of the most auspicious in large building operations that the city has known, the cost of improvements was a million and a third dollars less, but in number 400 more than 1907. The slump of the last quarter of 1907 was felt very severely in the city, and improvement was scarcely noticeable until March, 1908.

An interesting comparison is seen in taking the figures representing cost of improvements for January, 1908, as against those representing the cost for eight days of January, 1909. The cost of the 1908 month's operations was $95,000, and for the first eight days of the new year they are about $125,000. In December last 225 permits were issued for work to cost $350,630, and in December, 1907, there were 249 permits issued to cost $218,237.

In the 12 months of 1908 there were 6031 permits issued for buildings to cost $6,438,888, while in the year 1907 there were 5620 permits issued for building improvements to cost $7,737,062.

At the rooms of the Builders' Exchange the impression is gained that spring is expected to usher in an era of modest building prosperity. "Prices are now down," said Secretary S. L. Snodgrass to an inquiry, "but there appear to be good chances of an advance in material all along the line.

In the brick construction line President J. M. Blair of the Blair Brick Company, whose product was largely used in the $3,500,000 Woodward High School and the $2,500,000 Hughes High School, is of the opinion that the ruling prices are low, and believes they are not likely to see much advance. "In the brick construction line," he said, "prices are about 15 per cent. lower than for 1907, and I estimate that projectors of dwelling and pretentious structures of all kinds can build now 50 per cent. cheaper than he could in 1907." In vitrified brick construction E. F. Gray noted that operations are increasing rapidly in this line, particularly in the smaller municipalities, and that there will not likely be any change in price.

One of the big building events of 1909 in Cincinnati will be the starting of the $500,000 structure for the Ohio Mechanics' Institute, through the generosity of Mrs. Thomas Emery. In this building the principal elements will be reinforced concrete with steel trusses.

Architects view the Cincinnati situation rather conservatively, and believe there is little evidence as yet to indicate that the year will be remarkable for the extent and cost of its building operations. Cincinnati is a city of factory construction, and there are few large enterprises planned. In the residence line several enterprising local builders are preparing for outdoing their records of 1907 and 1908, especially in the suburbs.

Cleveland, Ohio.

The volume of building operations in 1908 was very satisfactory, considering the business depression during the greater part of the year. The number of permits issued by the city building inspectors' office, and the value of the new structures were both larger than during any previous year, with the exception of 1906 and 1907. During the year 6674 permits were issued for new buildings, their estimated cost being $9,896,869. The 1907 permits aggregated $15,888,400 and those of 1906 amounted to $12,927,974. During December last 387 permits were granted for buildings to cost $904,857, which is a slight increase over November.

The building outlook for the present year is very good. Work will be pushed on the $3,000,000 Cuyahoga County Court House, on which good headway has been made during the past year. This building, however, was not included in the building inspector's report for 1908, for the reason that the permit was issued during the previous year. The largest new building so far projected for construction during 1909 is the 12-story Brotherhood of Locomotive Engineers' $1,000,000 office structure, to be started early in the spring.

The annual meeting of the Carpenter Contractors' Association was held on Wednesday evening, December 9, following a beefsteak dinner at the Hofbrau. Speeches were made by several of the guests of the evening as well as by officials of the organization. The reports presented by the officers indicated that the association is in fine condition, and that the year just closed has been quite satisfactory, all things considered. The officers elected for the ensuing year were:

President, George Y. Farmer.
Vice-President, F. D. Stevenson.
Secretary-Treasurer, Harold Caunter.
Assistant Secretary, Chester M. Harris.

Columbus, Ohio.

The annual report of City Building Inspector R. A. Edgar for the year 1908 shows that 1698 permits were issued for new buildings, alterations and additions costing $3,400,275. These figures, however, do not include the buildings erected by the Government or the State. Of the total permits issued 1121 were for frame buildings and 557 for brick structures. In 1907 there were 2173 permits issued for construction work estimated to cost $4,181,260.

At the recent meeting of the Builders' and Traders' Exchange the following officers were elected for the ensuing year:

President, William Watson.
Vice-President, P. B. Gould.
Second Vice-President, A. Mulby.
Secretary, Charles R. Wilson.
Treasurer, Eph. Harris.

It is interesting to note that Mr. Wilson was re-elected secretary for the fourteenth consecutive time, which is striking testimony to his qualifications for the office.

Denver, Colo.

The activity in this city still continues, and notwithstanding the bad weather the building records for December show a decided increase over the same period a year ago. According to figures compiled in the office of Building Inspector Robert Willison 174 permits were taken out in December last for improvements estimated to cost $1,029,100, as compared with 105 permits in the same month in 1907 valued at $205,365. This large gain is accounted for in part by the permit for Clayton College, which included seven buildings, estimated to cost $276,000. Among the other improvements may be noted 92 brick residences valued at $252,000; also four apartment houses to cost $92,000 and nine business buildings to cost $165,000.

When the figures for the year are considered the increase, as compared with the year before, is no less marked. The total number of permits issued for 1908 were 3117 and the estimated cost $10,098,020, while in 1907 they were 2509, involving an outlay of $6,349,604. A notable feature of the year's work is the number of brick residences, 1714 permits having been taken out for this class of structure, estimated to cost $4,365,900.

In looking over the records for the last 10 years it is observed that the value of building operations have increased from $1,905,700 in 1898 to $10,098,020 in 1908, which is the banner year in Denver's history. The number of permits have also increased steadily, and last year shows double the number issued in 1901.

At a largely attended meeting of the Master Builders' Association, held on the evening of December 12, the matter of the ordinance limiting hights of buildings was the subject of discussion. The meeting appeared to be strongly of the opinion that the growth of Denver is being retarded and its prestige injured by the opposition to the tall buildings now in prospect, and resolutions were adopted affirming the stand of the association in favor of removing entirely the restrictions as to the hights of buildings, provided they are properly safeguarded with modern fireproof restrictions. A committee consisting of Alison Stocker, Thomas Bate and C. C. Schrepferman was appointed to lay the views of the association before the Mayor and Board of Aldermen.

Grand Forks, N. Dak.

The Builders' and Traders' Exchange celebrated the end of a successful business year on Tuesday evening, December 15, with a banquet, which was the fourth annual affair, at the Grand Forks Commercial Club. There was a representative gathering about the banquet board, among the guests being delegates of the Builders' Exchange of Fargo, architects and prominent builders from North Dakota and northern Minnesota. The Builders' and Traders' Exchange of Minneapolis was represented by its genial secretary, Eugene Young, who presented the good will and greetings of his organization.

A feature of the banquet were interesting addresses made by those present, and in the course of which was reviewed past achievements and their rich promise for the future of the building trades of the city. With the Commercial Club the Builders' Exchange has taken an active interest in the advancement of the city, the secretary of one organization acting as secretary of the other, and the quarters of the Builders' Exchange being in the club rooms so that in this way the two organizations are in close touch with each other. It is also worthy of note that William Spriggs, president of the Builders' Exchange, is also first vice-president of the Commercial Club.

As regards 1909 there is a feeling that both public and private improvements will be large, and that the constant demand for new houses will result in an active season for the building industry of the city and surrounding country.

Hartford, Conn.

A sharp curtailment in the building of dwellings, apartment houses and business buildings was responsible for 1908 being the poorest year in three in building circles. The total estimated cost of new buildings, additions and alterations in 1908 was $3,107,348, a decrease of practically 30 per cent., as compared with 1907, when it was $4,054,335.

According to Building Inspector Fred J. Bliss, permits were issued in 1908 for 184 dwellings and apartment houses involving an estimated outlay of $1,382,150, and for 18 factories and storehouses to cost $153,400. There were also two public buildings constructed costing $1,016,000. In 1907 there were 244 permits issued for dwellings and apartment houses costing $1,882,400 and two public buildings costing $1,100,000, as well as 17 factories and storehouses costing $362,200. Additions and alterations in 1908 amounted to $195,058, and in 1907, $421,455.

Houston, Texas.

At a meeting of the leading builders of the city, held on the evening of December 8, a temporary organization was effected with W. E. Woodruff as president, H. L. Weinberg as secretary and E. E. Holtcamp as treasurer.

A constitution and by-laws were adopted and a meeting was arranged for early in January, when the organization will be made permanent. The meeting on December 8 was called to revive the old Builders' Exchange, which ceased to exist some time ago.

Indianapolis, Ind.

Architects report plenty of work to be done during the ensuing year, and everything seems to point to a much larger volume of business than was the case during the 12 months of the year just closed. Building materials at the present time show comparatively little fluctuation, and it is not expected that there will be any marked advance during the year. The volume of new work projected in December was appreciably greater than in the corresponding month of the year before, the value being $270,537 and $79,808, respectively.

According to Inspector of Buildings Thomas A. Winterrowd there were 4013 permits issued in the 12 months of the year just closed calling for an estimated outlay of $5,895,928, while in the corresponding months of 1907 there were 3902 permits issued for building improvements costing $5,953,725.80.

Kansas City, Mo.

The nearer one approaches to the center of the agricultural regions the more he is apt to be impressed with the absence of effects which would naturally be expected to result from the money panic and business depression which were such marked features of the East in the early months of the current year. In December last the value of new building work projected was in excess even of that for November, while being decidedly ahead of December, 1907. The report of Superintendent John T. Neil of the Building Department shows 276 permits to have been issued for improvements costing $676,070, which are a marked contrast with the 161 permits issued in December, 1907, for building improvements costing $164,530.

Taking the superintendent's figures for the entire year it is found that 3829 permits were issued for new buildings, alterations and repairs calling for an estimated outlay of $10,562,041. These compare with 3943 permits issued in the 12 months of 1907 for building improvements costing $9,611,922.

Los Angeles, Cal.

Although the total for the building operations in this city for the year 1908 are only about two-thirds as large as that of 1907 and half as large as that of 1906, they have come quite up to expectations, and are, in the opinion of builders, fully as large as conditions justified. Few large buildings have been erected, and it would appear that the large number of these erected in the two years preceding about supplied the city's needs in that line for the time being. The building of residences has continued active, especially in the last few months, and in this line the year's record shows little, if any, falling off. The record for the year shows 7367 permits for buildings aggregating $9,934,198 in value, as compared with 7599 permits valued at $13,304,696 for 1907 and 9072 permits valued at $18,158,520 for 1906.

During the month just closed permits to the number of 581 were issued for work aggregating $667,629 in value, as compared with 400 permits valued at $403,987 in December, 1907.

Louisville, Ky.

A perceptible increase in the volume of new work was noted in December, as compared with the same month of the year before, when the extreme business depression existed. Last month there were, according to Building Inspector Marshall Morris, 127 permits taken out for improvements estimated to cost $129,443, whereas in December of the year before only 95 permits were issued for work costing $56,628.

A decided increase in the number of small buildings during the year was responsible for only a slight loss, as compared with 1907, in the estimated cost of new buildings to be erected. In 1908 this was $2,914,141, as compared with $3,032,574 in 1907. While no large construction work is at present on the boards the general outlook is very promising. No material change in the cost of building materials, as compared with a year ago, has occurred, but a slight increase is expected if operations are brisk.

Memphis, Tenn.

There was a slight increase in building activity in December last, as compared with the same month of the year before, showing a gradual approach to normal conditions. The prospects are now better than for some time past, and a record breaking volume of business is anticipated for the year. Building Commissioner Dan C. Newton states that 172 permits were issued from his office in December for building improvements costing $274,612, whereas in December, 1907 only 95 permits were taken out for new work and alterations estimated to cost $245,992. It may be stated, however, that permits for two public buildings, issued in 1907 and estimated to cost $1,250,000, were chiefly responsible for the comparatively poor showing for the 12 months of 1908, when the estimated cost of new construction was $3,300,508, as against $4,957,999 in the 12 months of the preceding year.

Milwaukee, Wis.

The outlook for spring building operations is at present regarded as very flattering, and exceptional activity in this line is anticipated by architects and contractors generally. This is all the more gratifying by reason of the fact that building operations seem to be the first to suffer from any business depression, however slight it may be, acting in a measure as a barometer to gauge the general prosperity. The present tendency of building materials would seem to indicate no immediate fluctuation in prices, and the current level is regarded as moderately low; in other words, any change is likely to be toward higher rather than lower figures.

According to Chief Inspector of Buildings Edward V. Koch, there were 168 permits issued in December last for building improvements to cost $831,777, these figures contrasting with only 86 permits for improvements costing $271,715 in December, 1907. For the 12 months of 1908 there were 4169 permits issued by the department for improvements estimated to cost $10,065,669, as against 3625 permits for new building work costing $10,771,244 in the 12 months of 1907. This is considered by the department as a most remarkable showing for the year just closed, inasmuch as it signifies a rapid recovery to normal conditions from a period of general depression.

Montreal, Can.

The members of the Montreal Builders' Exchange held their annual banquet on the evening of December 10, when more than 200 sat down to the tables. The master of ceremonies was Thomas Forde, president of the exchange, and the principal guests of the evening were Hon. Sir Lomer Gouin and Hon. C. J. Doherty. Various toasts were proposed and the remarks presented were followed with close interest. In addition to the guests of honor the speakers included among others David Brown, president of the Quebec Architects' Association; A. J. Dunlop, president of the Architectural Institute of Canada; F. C. Lariviere, representing the Chamber of Commerce, and F. Robertson, first vice-president of the Board of Trade.

Newark, N. J.

The value of new buildings and alterations for which permits were issued in December was almost double what they were in the same month in 1907, although the number of permits showed but a slight increase. According to the figures of the building department 183 permits were issued last month for improvements estimated to cost $641,034, while in December, 1907, there were 144 permits taken out for new building work involving an outlay of $362,461.

The total estimated cost of the work authorized during the 12 months of last year was $7,161,668, and the number of permits issued was 2285 in the 12 months of 1907. The value of the new work was placed at $9,546,725 and the number of permits issued, 2502.

New York City.

In common with other sections of the country building operations in this city have felt the stimulus of returning confidence, and the amount of new work projected in December was very heavy, when contrasted with the same month of 1907. The same remarks apply to the boroughs of Brooklyn and the Bronx, although the proportion of increase over the year before is not quite up to that of the Borough of Manhattan. According to the figures of the building departments the values of the new work projected in December in the Borough of Manhattan was $7,682,035; in the Borough of the Bronx, $2,795,510, and in Brooklyn, $3,733,590; these figures contrasting with $2,621,520, $1,201,525 and $1,984,324 for December, 1907, in the three boroughs, respectively. This increase has been due largely to the filing of permits in Manhattan for important building undertakings intended more especially for business purposes, while in the other boroughs the gain is more largely due to a resumption of dwelling and apartment house work.

In examining the figures for the 12 months of last year several interesting facts are noticeable. In the Borough of Manhattan a much larger amount of certain classes of work was inaugurated than was the case the year before, this being particularly apparent in the new hotel and office building construction, where the eight hotel buildings projected last year involved an estimated outlay of $5,595,000, as contrasted with the five hotel buildings projected in 1907, estimated to cost $997,000. There were also 46 office buildings for which permits were issued last year estimated to cost $34,980,050, while in the 12 months of 1907 the 61 buildings projected were estimated to cost $21,116,500. Another prominent feature of the record for the year is found in the tenement house construction, for which 240 permits were issued, calling for an outlay of $28,707,500 in the Borough of Manhattan, while in the five boroughs constituting Greater New York permits were issued for 1950 tenement houses involving an outlay of $54,250,000, as contrasted with 3601 new buildings costing $71,475,000 in 1907. The loss represented by the total figures occurred in Brooklyn and the Borough of Queens, the figures for Brooklyn being $11,475,000 for last year, as against $29,000,000 the year before. A feature of the operations last year in the Borough of the Bronx, where the work consisted for the most part of dwellings and flat houses, is that the average cost of the nearly 2000 buildings erected was $11,200, the highest average in the history of that section. The average cost of buildings in Brooklyn for the same year was $6000 and the Borough of Queens $3500. In the Bronx no less than 520 brick dwellings, principally two-family houses, were erected at an average cost of $6650 each. In addition, there were 320 apartment houses constructed at an average cost of $30,000 each, which figures speak in unmistakable terms of the substantial growth of that section of Greater New York.

The New York Building Trades Council of the American Federation of Labor is the name of a new organization of the building trades of the city. Heretofore the building trades of New York have not as a whole been affiliated with the Federation of Labor, although some individual trades have been. There is to be one charter for the entire city and all the trades controlled from one office. The officers elected at the formal organization of the council on January 12 were president, John J. Towers, a carpenter; vice-president, Fred Paulitsch, a sheet metal worker, and secretary, Roswell D. Tompkins, who has heretofore been the secretary of the Consolidated Board of Business Agents.

New Orleans, La.

The members of the Contractors' and Dealers' Exchange held their annual election on December 14, a large number being present. The reports presented showed that the exchange gained 42 members during the year and now has a roster of 196 names. The finances are in good shape, and the indebtedness on the new building has been decreased to a large extent. The meeting was in charge of President Aitken, who emphasized the necessity for co-operation on the part of all the members to the end that the presiding officer might carry on the work successfully.

The election of officers resulted in the following choice for the ensuing year:

President, George M. Leahy.
Vice-President, W. W. Van Meter.
Treasurer, George Abry.
The Board of Directors is made up of the following: James H. Aitken, H. W. Bond, F. L. Bixle, C. S. Barnes, N. R. Freeland, W. Jahncke, V. Lambou, A. M. Lockett, J. Loeffler, R. McCarthy, Jr., J. C. Maurer, J. W. Markel, James W. Porch, Guy Stone, Herman Thomas, L. D. Lagarde and John O. Chisholm.

Mr. Aitken introduced the new president, who responded by expressing his appreciation of the honor that had been shown him, and spoke of the unique place which the exchange occupies among the organizations of the city.

J. E. Porch, president pro tem. of the Belt Railroad Commission, was then introduced and spoke enthusiastically of the development along the river front during the past year, and of the advantages and possibilities of the port of New Orleans. He was followed by Col. J. P. Sullivan, who told of the work that had been done in putting the exchange in its present condition, and referred to the part taken by retiring President Aitken, to whom on behalf of the members he presented a beautiful gold watch fob. Mr. Aitken feelingly responded, and then there was a short talk from City Engineer Hardee, after which President Leahy on behalf of the members presented Secretary Moyston with a silver handled umbrella, commenting on the excellent work he had done and the high regard in which he was held by all the members.

After the business meeting had been concluded a bounteous luncheon was served, and the evening pleasantly passed in social intercourse.

Oakland, Cal.

The building record of December was good, and, notwithstanding the holiday season and rather unfavorable weather, the total ran up to 237 permits, with a valuation of $597,031, as compared with 182 permits, with a total valuation of $304,777, for the month of December, 1907. As in the preceding months of the present year, the bulk of the construction work was in the way of frame buildings, though several brick and concrete structures were included in the list of permits.

Architects and builders are agreed that the new year will show a larger percentage of brick and steel construction than any previous year, and that more expensive buildings will be the rule in the business section of the city. A good portion of the larger buildings so far planned for the new year are of a public nature, with school buildings predominating. Among the latter are the Boalt Hall of Law at the California State University, in the suburban city of Berkeley, to cost $200,000: the Lincoln and the Washington schools in this city, three new school buildings at Berkeley, and another in North Berkeley.

Omaha, Neb.

The building outlook in the city is brighter than at any time since what are regarded as the "old boom days," and the opinion is expressed that no surprise will be occasioned if the totals for the current year exceed any corresponding period in the city's history. Many large buildings are contemplated, including a million dollar court house, a half million dollar office and theater building, a half dozen business structures to cost from $40,000 to $125,000 each, a hospital to cost $150,000, and several warehouses to cost from $20,000 to $200,000. In addition to these, many dwellings are in prospect, and the records in the office of Building Inspector C. H. Withnell for the first week of January are almost equal to those of the entire 12 months of 1908. During the month of December last the total value of new buildings, alterations and additions for which permits were issued was $378,625, which compares with $420,135 for the month of November. In the corresponding months of 1907 the value of the building improvements was $279,775 in December and $381,765 in November.

The total valuation for the 12 months of 1908 was $4,590,650, which figures contrast with $4,536,643 in the 12 months of 1907 and $4,273,050 in the corresponding months of 1906. Of the 1526 permits issued last year 112 were for brick dwellings and 888 for frame dwellings. There were four brick churches projected, seven brick schoolhouses, five hospitals, six apartment houses and 26 frame and brick warehouses and factories. There were also 36 stores and office buildings erected.

At the annual meeting of the Builders' Exchange, held on January 4, the following officials were elected for the ensuing year:

President, J. E. Merriam.

Vice-President, A. C. Busk.

Secretary, C. A. Grigg.

Treasurer, Robert Sanderson.

Directors, R. L. Carter, W. H. Parrish, A. Borchman, M. Bjorson and Ray Gould.

In the evening the annual banquet was held at "Hanson's," there being present 125 members and guests. F. W. Judson acted as toastmaster, and short responses to toasts were made by Harry Lawrie, Victor Rosewater, John Latenser, A. J. Verling, George P. Cronk, G. W. Hitchcock, H. H. Baldrige and R. E. Sunderland.

Philadelphia, Pa.

While the past year in the local building trades could not be termed a good one in point of volume of business done, being the smallest of any of the past eight years, it may be considered quite satisfactory in view of the recent general business and financial depression. Statistics compiled by the Bureau of Building Inspection show that 8809 permits for 13,950 operations were issued during the year, the estimated cost of the work being $28,408,580, which falls $8,-251,075 below that of the previous year, but represents a fair average when compared with the yearly totals for the last decade. The following comparative table shows the volume of work for the two years:

	1907.		1908.	
	Operations.	Cost.	Operations.	Cost.
January	897	$2,488,460	578	$954,510
February	571	987,455	507	1,217,980
March	1,381	3,535,260	1,259	2,489,940
April	2,688	6,893,500	1,536	3,178,535
May	2,041	5,683,920	1,444	2,909,500
June	1,405	3,186,410	1,286	3,017,045
July	1,653	3,784,150	1,298	2,912,480
August	1,609	3,238,715	1,127	2,024,330
September	1,384	3,113,810	1,548	2,545,520
October	1,184	1,763,905	1,274	2,789,295
November	701	1,083,025	1,116	2,316,590
December	485	901,045	977	2,052,855
Totals	15,999	$36,659,655	13,950	$28,408,580

Two-story dwelling operations during 1908 represented a little more than one-third of the total expenditure during the year. Permits were issued for 5405, estimated to cost $10,380,450, a decrease of 2112 operations and $3,004,685 in value when compared to the previous year. The number of three and four story dwellings on which work was started during 1908 was 825, estimated to cost $4,066,325, a falling off of 253 operations, the loss in value being nearly a million dollars when compored to 1907. Manufacturing buildings, workshops, warehouses and boiler and engine rooms totalled but 117, at an estimated cost of $1,409,415, a decline of 56 in number and $2,366,180 in value, as compared to 1907.

Increased expenditures were shown in municipal work, such as schools, firehouses, police stations and other city buildings, that for the past year totalling $2,140,290, as compared with $1,057,390 the previous year.

The outlook for 1909 is considered very favorable. There is a more genuine display of confidence in the ultimate recovery of business, the financial situation is good, and there is a general disposition to carry out plans for extensive work in many directions, a large share of which has for some time been held in abeyance pending more favorable conditions. Costs which have to a large extent been shaved down to the lowest figures in order to keep forces occupied, resulting in a material decrease in profits, will probably reach a higher level, particularly if the amount of work anticipated comes out as builders, instead of taking work close to actual cost, will be inclined to include a fair profit in their estimates. Building materials may, as demand increases, also become higher in cost.

About the middle of December ground was broken for the first installment of 132 dwellings of the two-family type, which will front on Fifty-eighth and Pemberton streets and on Walton avenue, West Philadelphia. As soon as these are completed another installment will be started, and so on until the entire number has been finished. The operation is being conducted by Joseph C. Boggs, and the cost will aggregate in the neighborhood of $400,000.

At the regular monthly meeting of the Philadelphia Master Builders' Exchange, held December 22, nominations to fill the expiring terms of directors were made as follows: F. M. Harris, Jr., Henry Reeves, John S. Stevens, Frank H. Reeves, Jacob L. Tyson, John S. Makin, Cyrus Borgner, John L. Holmes and Wm. B. Groine, all with the exception of Henry Reeves and Jacob L. Tyson, having been nominated to succeed themselves. The election will take place on January 26, immediately after which the annual election of officers will be held.

Pittsburgh, Pa.

The month of December witnessed a decided falling off in the value of building improvements for which permits were issued, as contrasted with the same month of 1907, although it would have been natural to expect last month to have been far ahead of the corresponding period of a year ago, as the latter occurred at a time of extreme business depression. Pittsburgh, however, seems to have reversed the regular order of things, for during December 195 permits were taken out for building improvements costing $596,557, while in December, 1907, permits were taken out for 155 improvements costing $1,189,165.

Taking the year 1908 as a whole the showing is more favorable, for, according to the figures of S. A. Dies, superintendent of the Bureau of Building Inspection, there were 3851 permits issued for improvements costing $12,159,678, whereas in the 12 months of 1907 there were 3569 permits taken out for improvements costing $11,530,275.

Portland, Ore.

From a building point of view the year 1908 was the best in the history of the city, and the fact that the total valuation of the permits for the year amounted to over 10 millions and exceeded those of every city on the coast, except San Francisco, and also exceeded last year's record for this city by nearly a million dollars is considered as very encouraging by local builders. While there has probably not been an increase in the percentage of large modern buildings undertaken as compared with last year, there has not been the notable dropping off in these which has characterized the record of other cities of the coast.

During the month of December 269 building permits were issued in this city with a total valuation of $939,975, or a little more than the average for the year. As compared with the same month in 1907, the showing was remarkable. In December, 1907, only 138 permits with a valuation of $319,-245 were issued.

For the past year 4660 permits were issued for new work to cost $10,385,071, as contrasted with 3891 permits in 1907 for construction work to cost $9,446,982.

Rochester, N. Y.

The building outlook for the ensuing year is very bright, and a full measure of activity is expected in all branches of the industry. According to the figures compiled in the office of John A. P. Walter, fire marshal and chief of the Bureau of Building Inspection, 131 permits were taken out in December for improvements estimated to cost $357,635, as against 71 permits for building improvements costing $143,145 in December, 1907.

The total number of permits granted during the 12 months of the year just closed for new buildings and alterations was 1822 and calling for an outlay of $4,975,317. In the 12 months of 1907 there were 1929 permits issued for new buildings and alterations estimated to cost $6,752,615.

San Francisco, Cal.

The building record for San Francisco in December reached a total of only $1,853,542, leaving it the smallest month of the year from a building point of view. During the month of December, 1907, the record showed a total of $2,116,930 and during the month of November, 1908, a total of $2,743,111. Materials are generally firmer and lumber men in particular report a larger demand than for many months past. There has already been an advance in both logs and lumber in the north, and this has been followed by a slight advance here with a prospect of a still further movement in the same direction in the near future. There has also been a sharp advance in the price of brick. The general opinion is that frame construction will be very heavy not only in San Francisco and vicinity but throughout the State just as soon as the weather improves.

Taking the year 1908 as a whole the records of the Board of Public Works show that there was a drop of about one-third in the value of the new buildings undertaken, as compared with the year preceding. During the year 1908 the total was $33,758,890, for 1907 it was $50,490,490; for 1906, $39,254,467, and for 1905, $20,111,861.

The year has started out well, a number of large buildings having been announced during the past few days.

St. Louis, Mo.

Although somewhat early to formulate definite opinions as to the spring business in the building line, indications are such as to warrant the belief that labor will be well employed and architects, builders and contractors will enjoy a prosperous year. The tendency seems to be largely toward buildings intended for dwelling purposes which indicates a steady city growth. The figures compiled in the office of James A. Smith, commissioner of public buildings, show December to have been a month of unusual activity when contrasted with December of the year before. There were 579 permits taken out for improvements estimated to cost $1,386,459 in December last, while in the same month of 1907 there were 302 permits taken out for improvements costing only $399,-548.

For the 12 months of the year just closed the commissioner issued 9119 permits involving an estimated outlay of $21,190,369, while in the 12 months of 1907 there were 8554 permits issued for improvements estimated to cost $21,893,167.

St. Paul, Minn.

A feature of the local building situation has been the number of small dwellings erected in the suburban districts where building lots were easily within the means of workingmen who were endeavoring to secure homes and thus rid themselves of the burden of rent. During December the building inspector's office issued 224 permits for building improvements costing $887,124, while in December, 1907, there were 137 permits taken out for new work involving an outlay of $519,476.

During the 12 months of last year 3244 permits were taken out for improvements involving an outlay of $7,625,538, these figures contrasting with 2974 permits for improvements estimated to cost $9,024,355 in the 12 months of 1907.

Toledo, Ohio.

An increase in the volume of operations and the estimated value of buildings to be erected from plans filed in December in Toledo was witnessed. The figures compiled in the office of Joseph, McMahon, chief inspector, show that 72 permits were issued for buildings to cost $165,360. This is an increase of approximately 40 per cent. in the number of permits and 90 per cent. in the estimated valuation as compared with December, 1907. The total for the year, however, is disappointing, as the estimated valuation in 1908 was $2,092,083, as compared with $3,400,965 in 1907. This is accounted for by the great activity shown in the first 10 months of 1907 and the slow recuperation in 1908. The best month of the year was July, when 108 permits were issued calling for buildings at an estimated value of $354,238.

The outlook for the coming year is brighter than a year ago. The price of building materials is steady and wages have only suffered a small cut.

Winnipeg, Manitoba.

The members of the Builders' Exchange recently held their annual meeting, at which President J. W. Morley delivered a most interesting address reviewing the work of the exchange for the past year and thanking the members for their loyal support. The election of officers for the ensuing year resulted as follows:

President, W. H. Carter.
Vice-President, F. H. Davidson.
Second Vice-President, T. Black.
Treasurer, T. D. Robinson.
Secretary, A. Pearce.

Notes.

Building operations in Evanston, Ill., during 1908 reached a total valuation of $1,103,625, as contrasted with a total of $623,750 in the 12 months of 1907.

Architects, builders and real estate men in San Antonio, Texas, have been extremely busy during the year just closed and building permits to the value of $2,378,000 were issued by the city building inspector. In the 12 months of 1907 the value of the building permits issued was $1,951,393. In no other corresponding period has building reached such a status in the city as it did in 1908.

According to Building Inspector W. C. Fulcher there were issued in Knoxville, Tenn., during the year just closed permits for building improvements valued at $590,873. This total is only a little more than half of that for the preceding year and not quite half the record of 1906. The largest amount of work projected was in August, when the figures ran up to $162,453, while in December the valuation of new work was only $16,108.

At a meeting of the Independent Builders' Association of Palo Alto, Cal., held on the evening of January 5, the followlowing officers were elected: President, E. A. Hettinger; vice-president, B. F. Richards; secretary, G. V. Hayes, and treasurer, W. A. Waterman. The association was formed for the purpose of upholding the "open shop" principle.

According to the report issued by the Building Department of Wilkes-Barre, Pa., there were 535 permits issued in 1908 for buildings estimated to cost $1,657,986, compared with permits issued in 1907 involving an outlay of $2,486,861, thus showing a considerable decrease in valuation, although the number of permits issued was nearly the same. Of the permits issued during the year nearly half, or 261, were for dwelling houses.

The amount of building projected last year in Peoria, Ill., exceeded that of the year before by nearly $1,000,000. According to figures compiled by the Building Department there were 375 permits issued in 1908 for buildings estimated to cost $1,801,432, as against a valuation of $843,437 in 1907. December was the banner month of the year, as the new work projected in that month was estimated to cost $710,000, this being due in great measure to one permit for an office building involving an outlay of $650,000.

Building operations in the city of Trenton, N. J., were on an extensive scale during the past year, notwithstanding the general business depression which continued up to the time of the Presidential election. The amount expended for new buildings of all kinds and alterations was $1,600,000, which compared with $1,900,531 in 1907 and $1,841,123 in 1906. The activity last year was largely confined to dwellings, of which about 400 were erected. The most important work started from the municipal viewpoint was the new City Hall.

Since the great fire in Chelsea, Mass., the city has been making rapid progress in reconstruction work, and up to the close of the year more than 400 permits had been issued, some of them covering more than a single building operation. The value of the new work covered by these permits is considerably over $3,000,000, while the cost of alterations was in the neighborhood of $200,000. The fire, which occurred on the 12th of April last, destroyed 2783 buildings of all kinds, valued, as nearly as can be estimated, at between $5,000,000 and $5,500,000, so that it will be seen that when the structures for which permits have already been issued are completed considerably more than one-half of the work of reconstruction will have been done.

Slow-Burning "Mill" vs Fireproof Construction.

The relative value of what is known as slow burning mill construction and of structural steel construction when reinforced with concrete, was very interestingly discussed in detail in an address by J. H. P. Perry, recently delivered before the Modern Science Club of Brooklyn, N. Y. The speaker referred to the ancient use of concrete and dwelt upon the advantages of structural steel for building purposes when properly fireproofed. He also pointed out the efforts which have been made to obtain a structure which would be less costly than steel buildings, and yet one which would be fire-resisting to the highest degree. In part, Mr. Perry said:

"In comparing the advantages of the two methods of construction (mill and structural steel) and calculating the annual charges of insurance, interest, depreciation, maintenance, additional repairs to machinery caused by vibration, vermin losses, influence of maximum light on the effectiveness of the work of the employees, and the waterproof and sanitary qualities of the two buildings, it is possible to show an annual saving of from 1 to 2 per cent. by the adoption of reinforced concrete in preference to mill construction. The question of insurance rates is not by any means settled in the way it ultimately will be, as in some sections there is a tendency on the part of the insurance interests not to give concrete the benefit of the low rates that it should receive. Where it is possible, however, to bring in competition in the form of the Boston Mutual Companies, the rates on concrete buildings drop to practically nothing. On a large paper manufacturing concern's factory in Brooklyn and also on a large color works in Staten Island, both of them dangerous risks and with bad exposure hazards or with lack of adequate protection, the rate on the building is 10 cents per $100 insurance. There is one instance where rates of 6 cents on a large Chicago building have been quoted. Compare these with rates on mill buildings under similar conditions of occupancy, contents, and protection of 21 cents and 30 cents and 50 cents and it is easily seen where some of the 2 per cent. annual saving above referred to comes from. Reinforced concrete factories practically eliminate vibration under rapidly moving machinery. One large paper manufacturer in Brooklyn states that his nine-story concrete factory saves him 20 per cent. in the amount of power required to operate his machinery as compared to a six-story first-class mill construction building used for the same purposes. Also, this concrete building saves him about $5000 a year in the amount of repairs on his machinery. Both of these savings are due to the stability of the concrete structure. Machines once set in place and shafting once lined up remain in position, as there is no vibration to cause movement. It is easily appreciated that in a monolithic concrete building there is no place for vermin of any kind. With concerns which manufacture delicate materials or which have to store fruits or vegetables or other perishable goods the question of vermin loss is often a serious one.

"With reference to structural steel, concrete can be put up at a saving of from 10 to 15 per cent. on the same plans. There are several actual cases which may be cited where bids have been received by the architects for a building which could be constructed either in steel or concrete, and in every instance, for industrial purposes at least, the concrete figure has come under the structural steel figure by from thirty to forty thousand dollars on a quarter of a million dollar and larger propositions. This is owing to the expensive fireproofing of every structural member—beams, columns, girders, brackets, &c., with terra cotta, brick or concrete. The steel skeleton can be run up cheaply, but before the building is completed its cost goes over concrete most appreciably. The vibration in a steel building is liable to cause occasional trouble and there is always the question of rust and depreciation. With reinforced concrete structures, however, the steel used consists of small sized bars or wire, all of which is fully protected by concrete. Baltimore and San Francisco demonstrated beyond dispute the effectiveness of the concrete protection to steel under fire action. The Prussian Government and numerous other investigators have made futile further discussion of the rusting possibilities of steel bars imbedded in concrete. Tests of blocks under water, in steam baths, in sulphur vapor, and under pressure have proved the impermeability of concrete and its consequent prevention of rusting."

Competition in Plans for Cottages.

It will be remembered that in our issue for May last year we called attention to a competition in plans for cottages which was being conducted by the Rochester Chamber of Commerce, the invitation being for three classes of buildings. The Committee of Award, into whose hands the drawings were finally submitted for examination and which was made up of J. Foster Wanner, architect; John A. P. Walter, fire marshal of the city; Homer Knapp, a contractor; William S. Morse, president of the W. S. Morse Lumber Company, and William J. Hubbard, Jr., a manufacturer, recently rendered its report to the Board of Trustees of the Chamber, from which it is learned that there were 108 sets of plans submitted. Of this total 39 failed to comply with the terms of the contest and were therefore not considered, while 15 of the remaining number were rejected because of manifestly incorrct computations. The committee expressed the opinion that "many of the competitors were inexperienced in the producing of actual work for these low priced buildings."

The committee made the following awards:

$1500 class.
1st.—Esther M. Byers, Rochester, N. Y.
2d.—Clarence A. Livingston, Rochester, N. Y.
3d.—John Gallagher, Rochester, N. Y.
1st mention.—P. Chappell Browne, Portland, Ore.
2d mention.—William Eckler, Pittsfield, Mass.

$1250 class.
1st.—Esther M. Byers, Rochester, N. Y.
2d.—E. F. Brickell, Bradford, Pa.
3d.—H. A. Creager, Grand Rapids, Mich.
1st mention.—Ashton Pentecost, Toronto, Can.
2d mention.—E. F. Brickell, Bradford, Pa.

$1000 class.
1st.—T. T. Kelley, Youngstown, Ohio.
2d.—H. A. Creager, Grand Rapids, Mich.

The committee was unable to award the third prize and two mentions in the $1000 cottage class, as there was an insufficient number of plans remaining that were available.

Protection of a Newly Laid Tile Floor.

A large percentage of newly laid tile floors suffers the most reckless abuse and does not receive the same protection as ordinary concrete sidewalks. It may be that the hard surface of the tile and the apparent solidity of the floor deceives people, as they see no direct evidence of bruises if they walk over the floor or push trucks or furniture over it. There is no doubt, however, says H. C. Mueller, in the *Mantel, Tile and Grate Monthly*, that each tile which has received a jar has at least to some extent severed its adhesive connection with the mortar, and the result will be the eventual coming loose of this tile. It does not make any difference with what care a tile floor has been set, if a floor is not protected for at least four or five days against ordinary traffic, and for at least 10 or 12 days against the rolling over it of heavy furniture, no man can safely guarantee its durability.

We have two agencies which unite tile and mortar, adhesion and cohesion, the latter being the most important, as it means the chemical process by which the acids contained in the cement mortar dissolves the surface of the burned clay, forming a complete union. Wherever this process can go on undisturbed the cohesion between tile and cement mortar will be so complete that it will be impossible to separate the two, and if the tile thus firmly bedded into the cement mortar is forcibly taken up it will always be found that part of the tile will stay on the mortar or part of the mortar will adhere to the tile. If, however, a tile can be parted from the mortar without such evidence, it is clearly a sign that either the mortar was adulterated, or has had its initial set when the tile was set, or that the floor was abused shortly after it was laid, which caused the separation.

Ordinary conditions militate against the protection of a newly laid floor; other contractors engaged in the building, such as plumbers and steam fitters, joiners, &c., are awaiting the laying of the floor to begin their work, and the writer has often been shocked by the gross carelessness, often amounting to vandalism, with which a fine tile floor was treated.

CONTENTS.

Carpentry and Building

NEW YORK, MARCH, 1909.

Shingled Bungalow at Williamsport, Pa.

THE growing popularity of the bungalow is well illustrated in the variety and scope of the executed designs which are now to be found in practically every section of the country, and in the extent to which they are being erected for use in the rugged mountain districts for camping purposes; at the lakes, the seashore and in suburban communities, where nature's rustic scenery adds charm to the surroundings. An excellent example of the latter type is found in the bungalow which we illustrate this month by means of our half-tone supplemental plate and the drawings presented herewith. The supplement shows an interior view of the living room looking toward the ingle nook, while in the upper left hand corner of the plate is a miniature view of the completed structure. The view presented on this page shows the living room looking toward the bedrooms, which are at the end of the house, opposite the fireplace and ingle nook. Interesting features of the exterior are the brick plastered porch columns, the roof treatment, the shingled sides and gables and the effect produced by the exposed stone work of the chimney at the east end of the building.

According to the specifications of the architect, the cellar is excavated under the living room portion of the building, the foundation walls being of stone and the underpinning of random rubble work of local mountain stone laid with recessed joints. The stone walls of the cellar are dashed and whitewashed two coats. The floor of the excavated portion of the cellar is of cement resting on a concrete bottom 3 in. in depth. This is composed of three parts cinders, two parts sand and one part Portland cement. The finish is a 1-in. coat made up of one part Portland cement and two parts sand.

The house is of balloon frame, the rough lumber being hemlock. The corner posts and sills are 4 x 6 in., the latter being well bedded in mortar; the studs are 2 x 6 in., placed 16 in. on centers and set double at wide openings and braced overhead where required; the girts are 1x8 in., and the plate is made of two pieces of 2 x 6, breaking joints. The outside frame walls where they join the chimney are anchored to it with bolts placed 4 in. on centers. The first and second floor joists are 2 x 8 in.; the ceiling joist 2 x 6 in., all placed 16 in. on centers, while the main and porch roof rafters are 2 x 8 in., placed 2 ft. on centers. The girders on the piers in the cellar are built up of 2 x 10 in. and 2 x 12 in. hemlock joist, well spiked together. The girders over the porch piers are of 2 x 8 in. joist. The floor joist are strongly cross bridged with 1 x 2 in. pieces. The roof trusses are constructed as shown in the detail, of 6 x 6 in. and 4 x 6 in. yellow pine.

View in Living Room Looking Toward the Two Bedrooms.

A Shingled Bungalow at Williamsport, Pa.—Charles Barton Keen, Architect, Philadelphia, Pa.

The outside frame walls as well as the vertical faces of dormers are sheathed with hemlock boards, surfaced on one side and laid horizontally. Over the sheathing is one thickness of Neponset red building paper, well lapped, this in turn being covered with shingles laid about 8 in. to the weather. The roofs are covered with 6 x 22 in. split cypress shingles laid 7 in. to the weather. The shingles on walls, gables, dormer faces, &c., were treated to three coats of linseed oil and lead paint, while the roof shingles before being laid were dipped in Dexter Brothers' English shingle stain.

The porch floor is paved in brick, as indicated on the plan. On top of the earth filling is a bed of 6 in. of screened cinders well tamped, over which is a cinder concrete foundation 3 in. thick composed of 1 part Portland cement, 3 parts sand and 5 parts cinders. On top of this is a bed 1 in. thick composed of 1 part Portland cement and 3 parts sand. The brick pavement is laid flat with a border of one row of bricks on edge.

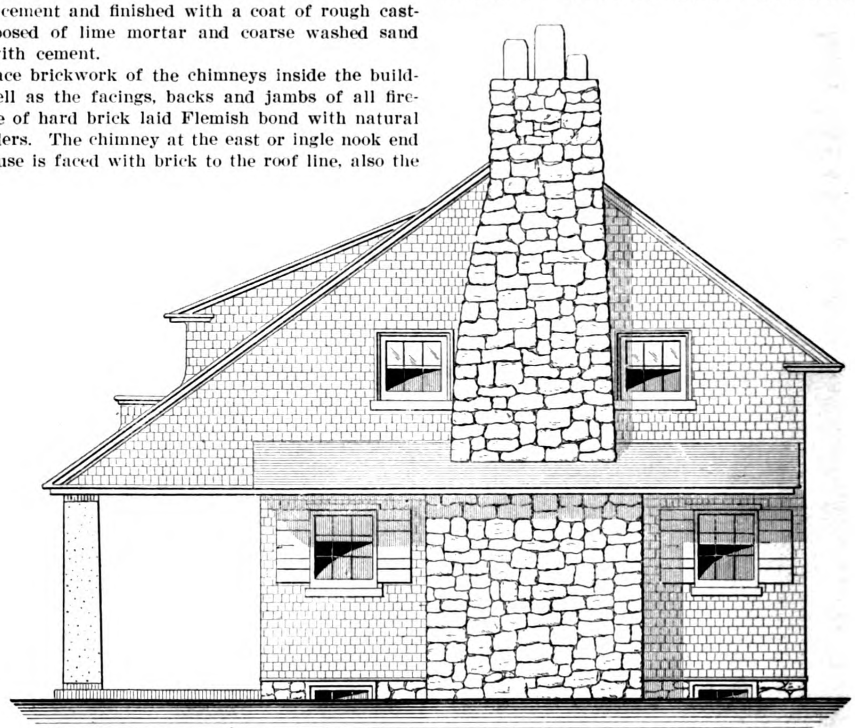
The columns of the porch are of brick laid as near round form as possible, every fifth course being bonded by galvanized hoop iron ties laid across. The brick are covered with two coats of lime plaster stiffly gauged with Portland cement and finished with a coat of rough casting, composed of lime mortar and coarse washed sand gauged with cement.

The face brickwork of the chimneys inside the building as well as the facings, backs and jambs of all fireplaces are of hard brick laid Flemish bond with natural deck headers. The chimney at the east or ingle nook end of the house is faced with brick to the roof line, also the chimney at the bedroom end from the second floor line to the roof. The outer and inner hearths of all fireplaces except the tile hearth of the living room are of brick the same as the facings, laid herring bone on edge.

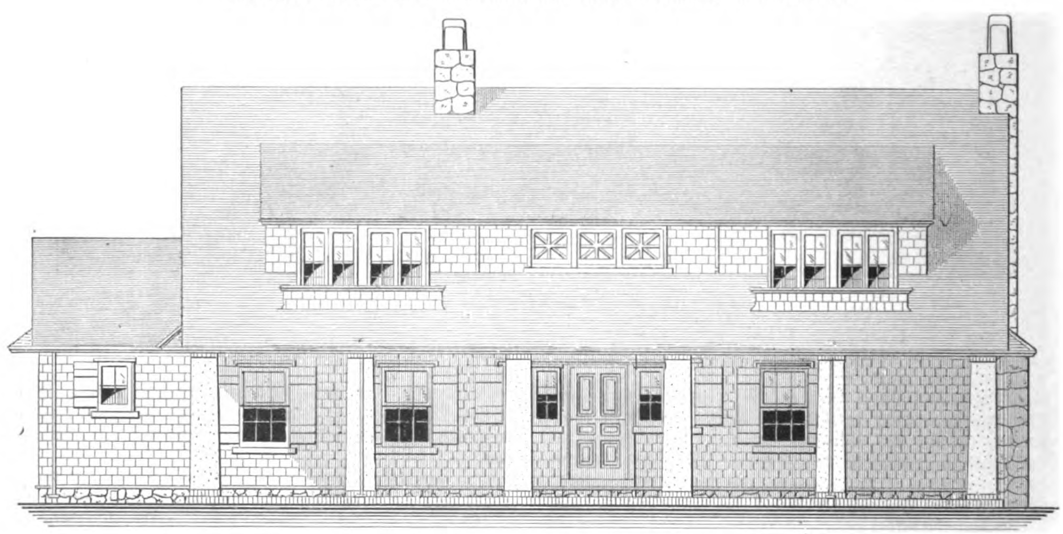
The main story has an under flooring of rough hemlock boards laid diagonal, over which is placed one thickness of "Florian" fireproofing deadening felt. This, in turn, is covered, except in the kitchen, with quartered white oak flooring strips, having 2-in. face. The kitchen and second story have a finished flooring of rift sawed North Carolina pine. All flooring is tongued and grooved and secret nailed.

The balconies of the second floor have North Carolina pine flooring, 3½-in. face, with joints struck smooth and covered with No. 6 cotton duck. The wood floor was prepared with a heavy coat of linseed oil and white lead paint, and the canvas laid while the paint was wet, the canvas being stretched as much as possible and tacked on the edges with 12-ounce Swedish galvanized tacks, placed not over 1 in. on centers.

All interior finish is of selected chestnut, except in the bedrooms and bathroom, where it is first quality poplar. The living room, ingle nook, main stair hall and



East End Elevation, Showing Chimney Construction.—Scale, ⅛ In. to the Foot.



Front Elevation.—Scale, 3-32 In. to the Foot.

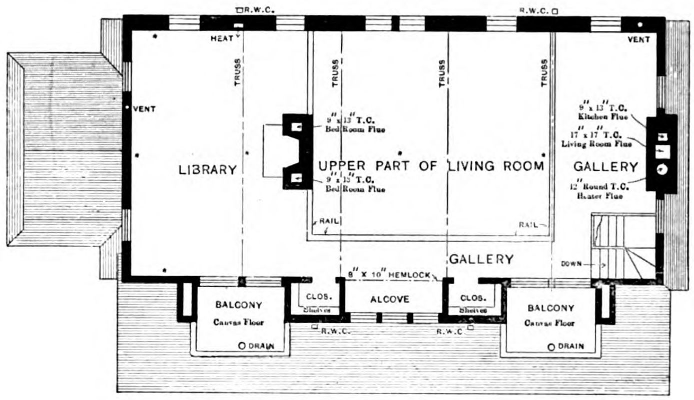
A Shingled Bungalow at Williamsport, Pa.

the walls of the entire second floor as well as both faces of balcony rails are finished with 1-in. chestnut pieces 6 to 8 in. face, rebated on edges and set so that the plaster will finish ½ in. inside the face, giving a half timber effect. The window and door finish is worked with a round bit jack plane to imitate adze finish. The beams under the gallery and over the opening to the ingle nook are cast; the ceiling of the ingle nook having six built up beams 5 x 5 in. There is also a beam over the 4-in. recess in the fireplace.

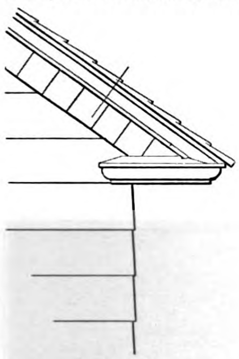
The walls and ceilings are plastered with three-coat work. The two bedrooms have a coat of hard white finish, while all other plastering has a coat of sand finish floated up with cork floats, the sand finish being covered with Pecora mortar colors.

The kitchen is fitted with a 40-gal. galvanized iron range boiler on standard, an 18 x 30 in. heavy enameled iron roll rim sink with 24-in. ash drain board and enameled iron back 15 in. high, full length of sink and drain board. In the bathroom is a 22 x 30 in. porcelain enameled "Pedestal" wash basin, with nickel plated fittings, a "Royal" low down siphon jet combination water closet made by John Douglas Company, and a 5-ft. "Occident" porcelain enameled roll rim bathtub made by the Standard Mfg. Company.

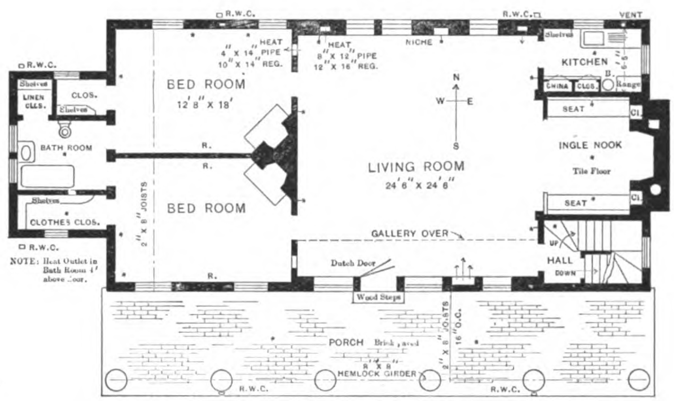
The house is piped for gas in accordance with the rules of the Williamsport Gas Company.



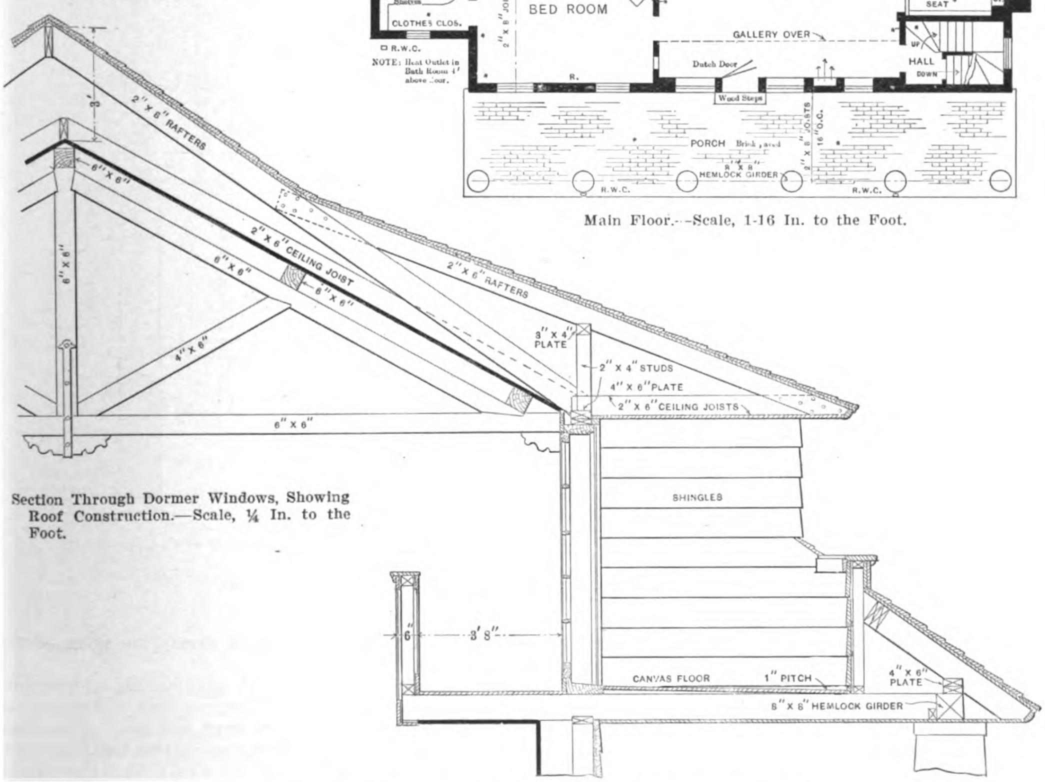
Second Story and Roof Plans.



Return of Cornice at Ends of Main Building.



Main Floor.—Scale, 1-16 In. to the Foot.

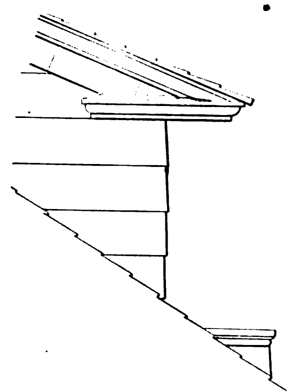


Section Through Dormer Windows, Showing Roof Construction.—Scale, ¼ In. to the Foot.

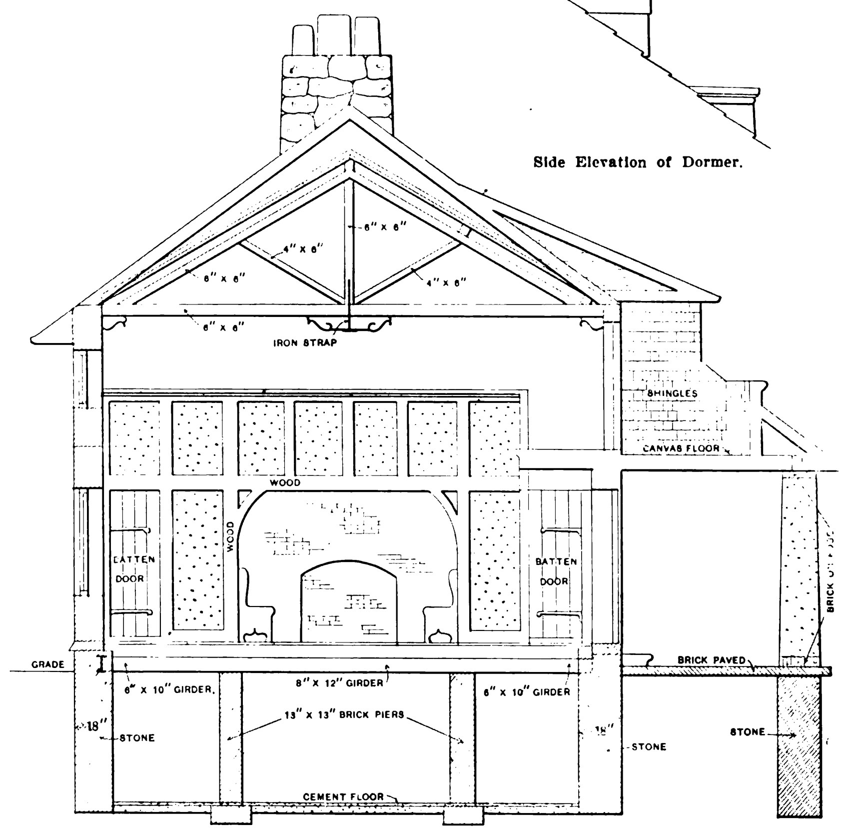
A Shingled Bungalow at Williamsport, Pa.—Floor Plans and Details.

All exterior woodwork, including ceilings of porch, balconies and eaves of all roofs of the building, has three coats of white lead and linseed oil paint. The canvas floors of the balconies have three coats of oil paint, the last coat being put on after all work in the building was completed. The outside plaster work of the porch columns has three coats of lead and oil paint. All interior finish throughout the two bedrooms and bathroom, as well as the closets, has three coats of French zinc and linseed oil paint in tints. All chestnut finish in the balance of the house has an oil stain, and is finished with one coat of surface and one coat of "Dead-lac," made by Chicago Varnish Company. The walls and ceilings of the bathroom are painted four coats of lead and oil. The top floors of the first and second stories, as well as treads and risers of main stairs, have a coat of filler, one coat of shellac and a coat of wax rubbed to a dull gloss.

The bungalow here shown is located at Valmont, a suburb of Williamsport, Pa., and was erected for C. La Rue Munson, in accordance with drawings prepared by Charles Barton Keen, architect, 1218 Chestnut street, Philadelphia, Pa.



Side Elevation of Dormer.



Cross Section of Building, Showing Roof Construction.—Scale, ¼ In. to the Foot.

A Shingled Bungalow at Williamsport, Pa.—Elevation and Detail.

Cost of Land Limits Use of Reinforced Concrete.

The third lecture of a special course of five addresses on the various phases of building construction in which builders and real estate men are interested was delivered on the evening of Tuesday, January 26, before the Real Estate School of the West Side Young Men's Christian Association, 320 West Fifty-seventh street, New York City. The speaker was G. R. Davis of the real estate firm of A. L. Mordecai & Son, who took for his subject "Building Construction from the Point of View of the Real Estate Man and the Speculative Builder." Mr. Davis pointed out that a real estate man in order to ascertain the value of an improved parcel must not only be a good judge of the value of the land, but of the building as well. He advanced the idea that if persons active in the real estate market had a more or less general knowledge of the manner in which buildings, both fireproof and non-fireproof, are constructed they would be better able to understand and appreciate the difference between proper and improper construction; between good and poor materials, and thus estimate more closely the value of the buildings.

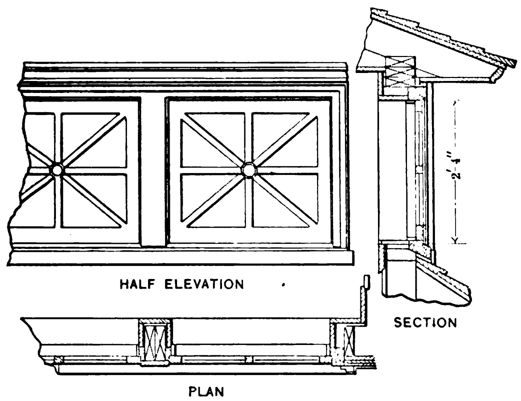
The speaker illustrated by drawings on a blackboard how the fireproof and non-fireproof flats and apartment houses of the city are constructed, and gave in detail the methods employed in putting up various buildings from the foundations to the roof.

In regard to the use of concrete construction, he commented in part as follows:

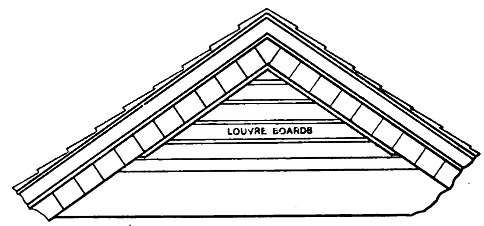
"Reinforced concrete construction is impracticable for flat houses and apartment houses. In such buildings where reinforced concrete is used a greater thickness of the walls is necessary than if brick, stone or steel is used, and this thickness is a great disadvantage in this city, where land is too valuable to be wasted in this fashion.

Another factor which makes it impracticable to build such structures of reinforced concrete is the greater length of time it takes to erect those types of buildings than it does those of steel and brick."

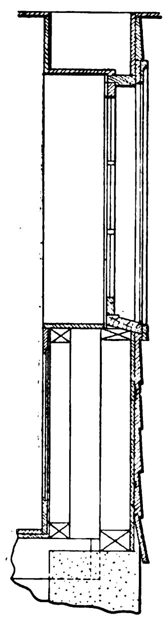
"This may be partly due to the fact that the contractors in this city are not used to or have so little demand for this class of construction that they cannot handle a job of this character with the same expedition that they can a building of steel or masonry. There is no doubt that reinforced concrete is a most fireproof form of construction and a most suitable and enduring one, but it has not yet been shown to be practical for the speculative builder to adopt. In fact, in the building of garages, &c., which are generally built on low priced land, and where the loss of 6 in. or a foot in the width of a room or the hight of a ceiling is not so important, reinforced concrete is an admirable method of construction and is deservedly popular."



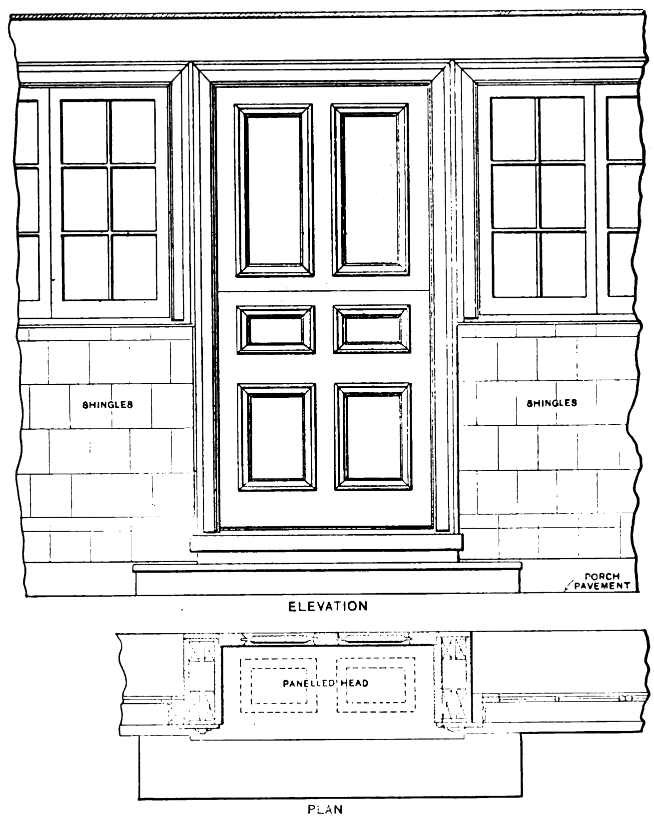
Details of Triple Window Over Front Entrance.



Detail of Gable in Bathroom Extension.



Vertical Section Through Windows at Right and Left of Front Door.—Scale, 3/8 In. to the Foot.



Plan and Elevation of Main Entrance Door.

*A Shingled Bungalow at Williamsport, Pa.—**Miscellaneous** Constructive Details.—Scale, 3/8 In. to the Foot.*

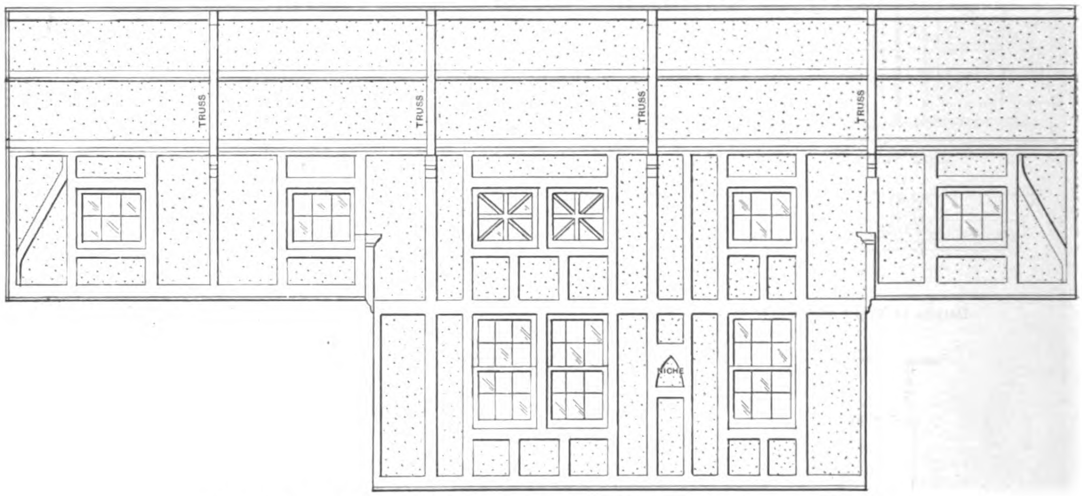
Architectural Modeling.

The process of modeling the architectural decorations that form so important a part of the adornment of modern buildings gives employment to a large number of skilled modelers and forms an important industry. Full size plaster of paris models for all of the decorative details are made, from which the finished work is cut in stone or granite. The following interesting description of the making of the "maquette" or model from the architect's scale drawings was given in a recent issue of the New York *Times:* The first operation is the building of the "bed" in which the glue mold is to rest. This bed is made of a combination of plaster of paris and oakum. It is assembled on a low table, around the edges of which are placed strips of wood to prevent the liquid plaster from running onto the floor. Wherever a projection of any importance is indicated on the scale plans a roughly formed indentation in the plaster is made. Where there is a depression shown on the plans the plaster is built up above the level surface corresponding approximately with the figures on the plans.

When the plaster hardens it presents an uneven surface, broken up into many hummocks and holes, resembling very roughly the outline of the finished maquette.

Meanwhile, the finished model in clay has been executed. It is reinforced with stiffening substances and can bear its own weight without crumbling. It is carried to the bed and laid, modeled side downward, on top of the plaster. The value of the roughened surface the surface of the glue is neared. At last the glue mold is exposed, showing in every detail the future maquette inversely.

Plaster of paris is next poured into the glue mold, resting on its bed. When this in turn hardens it is lifted off the table, the big sheet of gelatinous substance sticking to its under surface. The pliability of the glue, however, permits of its being torn away from the plaster cast without injuring its face. It is immediately placed back again on the bed, ready for the next cast. Eventually it finds its way into the glue pot to be melted and used over again in some other form. The plaster of paris



View of Living Room Looking Toward the North Wall.—Scale, ⅛ In. to the Foot.

Living Room Looking Toward the Main Entrance.—Scale, ⅛ In. to the Foot.

A Shingled Bungalow at Williamsport, Pa.

of the bed is now seen. Up into every little niche in the clay model a projection of the plaster bed now extends, maintaining at every point an approximately equal distance of about 2 in. from the surface of the clay. The juncture between the plaster bed and the clay model is made absolutely airtight along the edges of the table. Three or more holes are bored into the clay along one end of the model and outside the beginning of its ornamentation underneath. Big funnels are inserted tightly into these openings.

Now the hot glue is poured through the funnels down into the space between the bed and the finished surface of the model. Vent holes in the clay allow the air to escape slowly as the glue is forced in. When it has become fixed the clay is torn away, fine tools being used as cast, an exact reproduction of every detail shown in the original scale drawings, is carefully cleaned and sent to the architect, the finished maquette. With the benefit of the maquette the architect now has drawn a new set of scale plans, correcting the errors of projection in the original set by comparison with the little plaster cast.

After the modeler has collaborated with the architect as to corrections in the little cast, the full size drawings are given him and he is ready to begin the final stage of the work. Generally these full sizes are sufficiently simple in decoration and of small enough dimensions to admit of the use of the glue mold process again. In work of unusual size, however, the *cire perdue* process, similar to that used in casting bronze, is employed.

INTERIOR AND EXTERIOR VIEWS OF BUNGALOW OF MR. C. LA RUE MUNSON, AT VALMONT, WILLIAMSPORT, PA.

CHARLES BARTON KEEN, ARCHITECT

CAST REINFORCED CONCRETE PILES.*

Arranged for *Carpentry and Building* by SANFORD E. THOMPSON.

When the driving of the piles was actually begun the number of blows of the hammer was recorded by a mechanical counter, and the time required for each blow or for a series of five blows was entered on the note sheet, together with the hight of the drop and the penetration, the latter being read from a scale painted on the gins of the pile driver. Of course any stops during the driving were noted, with the length of the stop and the cause.

The least number of blows required to drive a pile to hard pan was 118, and the number ran from this to about 1200 blows. One of the piles was given 1098 blows with a hammer drop of 3 ft., which was later increased to 9 ft., and upon lifting the hammer it was found that only the edges of the head of the pile were rounded off, and that none of the reinforcement was exposed. One of the piles evidently struck a large boulder at 18 ft. below the surface. This pile was given 735 blows with a drop of hammer of from 1½ to 2½ ft., and at this stage the head was so badly crushed that the driving was stopped and the projecting portion cut off.

Fig. 4 shows the pile with head smashed, exposing reinforcement. This cut off section was squared off at the ends, as shown in Fig. 5, and sent to the Watertown Arsenal to be tested to see what effect the tremendous pounding with a 4700-lb. hammer had had on the pile. The test showed that the ultimate strength developed was 3865 lb. per square inch, and that it failed at the smaller end, and not at the larger one which received the direct blows. Other tests at the Watertown Arsenal on reinforced columns, which were similar to this one except that this one was tapered, show that the ultimate strength of such columns range from 2000 to 3000 lb. per square inch; thus it appears that notwithstanding the many heavy blows this pile had received, its ultimate strength was considerably higher than the average strength of similar columns.

On this job the time driving was greatly increased by the poor water pressure. Taking an average of 16 of the piles, which might be assumed to have gone down fairly well, the time per pile was 1 hr. and 24 min., or the total number of piles per day was 5.75. As the men became more proficient and accustomed to the work as many as 9 and 10 piles were driven in a day.

Records of six of the typical piles are plotted, and the curves are shown in the diagram, Fig. 6.

The full curves show the portion of the driving where the water pressure was on, and the dotted lines the driving after it had been cut off by the filling of the pipe at the tip of the pile. This stoppage was not necessarily due to the design of the pile nor to the method of driving, but chiefly to the insufficient capacity of the pump.

The flattening out of the curves indicates difficulties in driving, usually because of the poor water pressure or the striking of some obstruction. In certain cases irregularities in the curves show that when the pile was slightly jerked, ground was lost instead of gained.

Curves of piles N, F and Y are given to show good driving, the pressure remaining on most of the time, and the total net time omitting all unnecessary delays being from 23 to 30 min.

Piles F and Y show also that if a greater drop of hammer had been used at the start they would probably have approached nearer to N.

In driving pile N at 24 ft. depth the hammer was allowed to just tap the top of the pile with no impact, and raising the pile slightly it lost ground, as shown by the slight drop in curve. Then by increasing the length of the blow it started down again. Time driving 23 min., with 118 blows.

On pile F they first began jerking the pile after each blow, and this method appears to be effective, provided ground is soft enough to actually lift the pile readily. In hard ground it is ineffective. Drop of hammer was increased from 0.5 to finally 4 ft. Time driving 24 min., with 185 blows.

Pile Y was not churned or lifted after first blow or two, but went down with light blows. Time, 30 min.; 225 blows; pressure good.

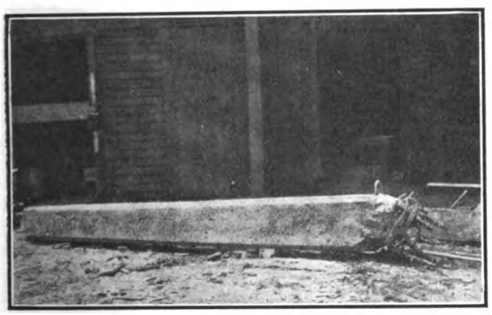


Fig. 4.—Pile with Head Smashed, Exposing Reinforcement.

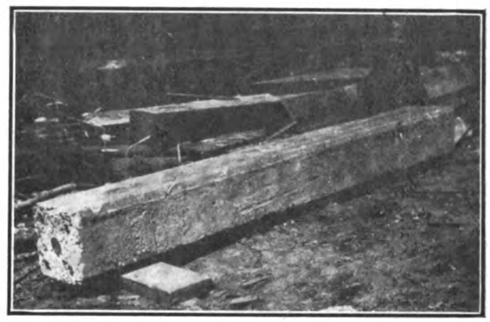


Fig. 5.—Concrete Pile with Ends Cut Off Square Ready for Test.

Cast Reinforced Concrete Piles.

The curve of pile B is given to illustrate hard driving due to lack of water pressure. The water pressure stopped at 11½ ft., as shown by the sudden break in curve at this point. Total time driving pile was 83 min., with 895 blows.

In the curve of pile 0 there is an interesting break at the depth of about 20 ft., where an effort was made to assist the pile by churning or jerking and ground was lost by doing so, and the pipe was also allowed to plug. As soon as the hammer was allowed to drop in the usual way the penetration began again, but 647 blows and 70 min. by net time were required to carry it to its full depth. At a depth of 2½ ft. an obstruction was met, as indicated by the curve, and after a short time a small piece of timber was washed up beside the pile. Another reason for the flat curve of the pile is that the ground was unusually hard.

Pile 17 was driven in an experimental fashion to determine the effect of the jerk at the end of each blow. The curve is uniform throughout, showing that this jerk is absolutely ineffective in hard ground. In this pile, as noticed, the hight of drop was increased to 8½ ft. to see just what the effect would be upon the pile. It sustained this great impact without appreciable injury.

In one other pile, not shown on the diagram, the drop reached 12 ft. The head was slightly smashed with this severe treatment, but no rods were exposed. During the driving of this pile different hights of drop were used, varying generally from 2½ to 4 ft., and greater penetration is shown with the 4-ft. drop. The average drop for this pile was 5 ft., and as the water pressure stopped

* Concluded from page 47, February issue.

when about one-half way down, it required 1000 blows and 160 min. to drive it.

Cost of Concrete Piles.

The cost of driving piles on the Boston Woven Hose & Rubber Company job was as follows:

	Cost per lin. foot.
Platform and forms:	
Material	$0.051
Labor	.092
Making and placing concrete:	
Material	.150
Labor	.088
Reinforcement, pipes, &c.:	
Material	.372
Labor	.096
Pile driving:	
Miscellaneous costs	.088
Labor	.285
Teaming and getting ready	.068
	$1.290
Add 30 per cent. for pumping, miscellaneous items and contingencies	.360
Total per linear foot of pile	$1.650

The total cost per linear foot of pile, as shown above, was about $1.65; but this amount will vary with the number and length of piles made. By making a study of the detail times taken, various items will be suggested where the costs on other jobs may be altered.

The total cost of labor on the concrete on this job per linear foot of pile was $0.088, which amount appears large, and on another similar job might be reduced to $0.058. This assumption is based on the fact that while on the average only six piles per day were made, toward the latter part of the making nine piles were made on one day and 10 piles on another, so that an average of eight piles should be possible with a given gang. This is especially probable because the cost of making and placing the concrete was $2.25 per cubic yard, whereas the writer's data on hand mixing indicate that the cost should not have exceeded $1.50 per yard.

With reference to the time and cost of the driving, it must be taken into consideration that the job was a small one, only 48 piles being needed; that the work was of an untried character, and also that the conditions were unfavorable, especially as regards the water pressure. On a large job in ordinary ground, where large stones or obstructions are not likely to be encountered, the number of piles driven per day should be greatly increased. A study of the detail times in table B at the end of the paper, and a comparison of these times with detail records taken on other jobs, indicate that the average time per pile driven with the aid of a water jet may easily be reduced to 1 hr., while if the ground is very soft, the average time per pile, including the moving of the driver, need not be over 40 min. One hour per pile corresponds to eight piles per 8-hr. day, instead of three and one-half piles per day. The estimated time on the items near the foot of the cost table, which is inversely proportional to the total number of piles given, would be decreased on a job having 200 piles from $0.139 to $0.035 per foot of pile. This, together with the reductions noted above, and the assumption of eight piles driven per 8 hr., would bring the estimated cost per linear foot down to $1, net, or, with 25 per cent. allowance for pump hose connections, incidentals and profit, to $1.25 per linear foot. In soft ground, and where conditions are specially favorable, a still lower estimate is possible.

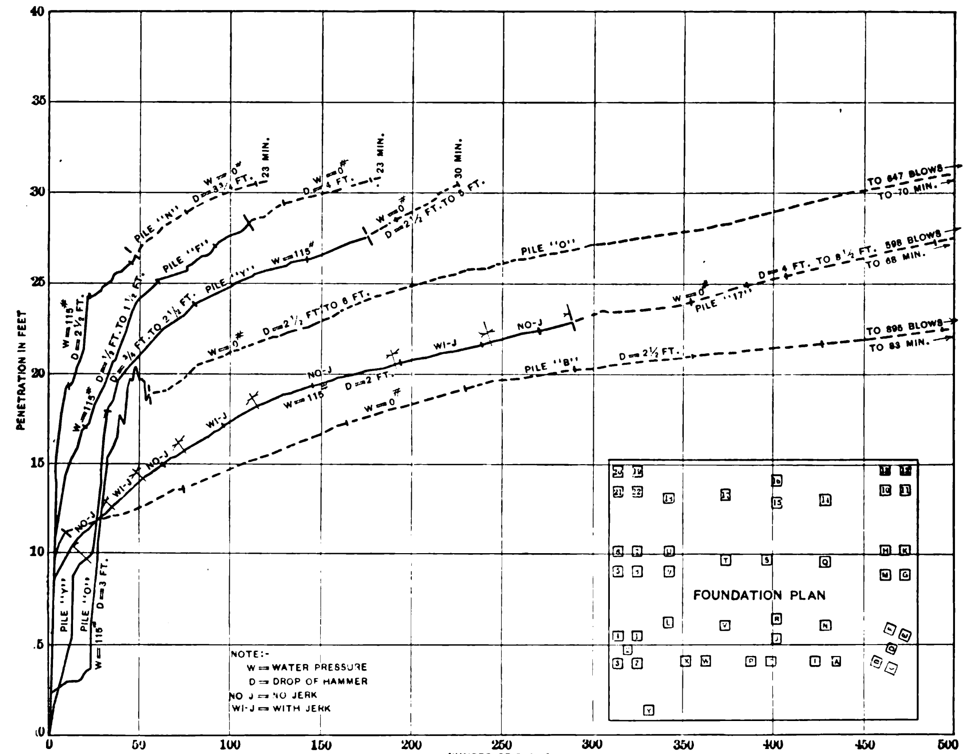


Fig. 6.—Diagram of Concrete Pile Curves, Showing Characteristics of Driving.

Cast Reinforced Concrete Piles.

A Concrete Block Police Station.

Concrete blocks are to be used in the construction of the new Clinton street police station, plans for which were filed in the Borough of Manhattan, N. Y., a few days ago. The building will cost $165,000. It will be of the Florentine Renaissance type, finished with stucco on the interior, and occupying a plot on Clinton street facing the Williamsburg Bridge plaza at its end on Delancey street. It will be lighted by large latticed windows, and will front 100 ft. on the plaza and 81 ft. on the northeast corner of Clinton street. It is to contain a series of separate cells for male and female prisoners, and three floors of dormitories with baths for the policemen. It will have a stable adjoining a court, and driveway.

SYSTEM IN THE EXECUTION OF BUILDING CONTRACTS.*—I.

BY ARTHUR W. JOSLIN.

A BUILDER who has the reputation of doing good work, finishing it promptly at or before the agreed time and paying his bills, does not want for plenty of work at good prices. I am going to try and explain to the readers, as I see it, how to secure a reputation for doing good work, how to get the contracts completed on or before time, and in doing both of these things make sure of plenty of work at prices that return something more than a mere living.

To do good work it is necessary to buy first-class materials and take proper care of them after they come into your possession; hire first-class workmen and see that they are properly directed and supervised. Buying first-class materials does not always imply paying the top market price. A builder with a reasonable amount of capital and whose credit is known to be good, usually gets the best materials for less than the indifferent builder of doubtful credit pays for inferior goods.

Care should also be exercised in the placing of subcontracts, letting work only to such men as are of good character and who have established a reputation in their particular line.

All material purchased for a building should be delivered at such times as will insure some one in authority being present to receive it, and should then be unloaded with such care as the nature of the material requires. If protection from the elements is necessary see that canvas, lumber, sheds, &c., as needed, are at hand. Three-fourths of the jobs I see in process of construction look as if there had been a cyclone in the vicinity the day before. All sorts of stock is strewn through the building and round the premises; window frames are mixed up with brick; outside finish on the floors is being walked over; mortar bed is so placed as to spatter the face brickwork and the *débris* of several months' operations is still under foot, scattered about the premises. I do not need to tell the reader that the best of stock delivered on one of these jobs soon becomes second or third grade stock, causing annoyance to the owner and architect, and often causing the rejection of material, even after some of it is in place. Replacing stock thus damaged is a constant drain on the possible profit of the job. The improper handling and storing of stock in this way can have but one result upon the labor and that is to make it cost more than it should.

The cause of most of these evils is the contractor himself. If the foreman finds that the contractor will not stand having stock so handled, he will very soon do different. If he will not follow suggestions or orders from headquarters in regard to these matters it is time to get a new foreman.

When Starting a Job.

When about to start a new job of any size go to the site with the foreman who is to be put in charge of the work, taking the plans along and spend anywhere from an hour to a day right on the spot studying the conditions. Determine the location of the derrick and engine if the work requires them; locate the office locker, tool and stock shanties; pick out a place to make mortar; a place or places to pile brick; places to pile up lumber and a place to frame it; map out a road to or around the building, locating it in such a way that all materials are readily handled from the teams to the appointed places, or so that heavy materials may be pulled under the reach of the derrick boom and be taken from the teams and piled outside or landed on the building without any unnecessary or double handling.

In locating all piles of materials and shanties try to foresee the various trenches that will have to be opened or yard work that will have to be done and figure out the probable time that such excavations or work will have to be started, taking care not to pile materials in these places that will not be used up before the time for doing the work arrives. For instance, there may be some retaining walls, catch basins and drains which upon due reflection you may conclude better be left until the superstructure is up. This being the case, you may safely pile such brick and lumber on this part of the lot as will be used in the superstructure, knowing that they will all be incorporated in the building by the time you are ready to take up the retaining wall and drain work. On the other hand, it might seem advisable to open these trenches for drains and walls and put them in at once, thus getting something done while you are assembling the more complicated materials for the principal work. You would then pile stock elsewhere or delay delivery for a few days until such time as the drains were in and filled over, after which you could use the location for piling stock.

Having thus mapped out the matters above referred to, the next step is to put the work in operation. Build the office and install the foreman with a complete set of plans and specifications. Next build the tool shanty and begin installing the equipment of hand tools, such as picks, shovels, bars, barrows, scythes, axes, timber dollies, rollers, peavies, ropes and blocks, winches, lanterns, &c. Everything that there is a possible chance of wanting should be included, so that should there arise the want of anything it is immediately at hand. This avoids delay and delay is expense. Enough work can frequently be accomplished with the proper tools to pay for them several times over on a single job.

Now give the foreman as many men as he can use to advantage and begin to pile up stock. Don't be afraid to pile up stock. Lots of time is lost on the majority of jobs by negligence in ordering materials and piling them up in advance of their being wanted. A job that requires 500,000 brick should have at least 100,000 piled up on the premises while the foundation is going in and before a brick is laid. When brickwork is started plans should be made to have about as many brick delivered per day, or per week if they are coming by cars, as will be laid in the corresponding time. The 100,000 piled up will give a surplus to draw upon in case of failure or delay in agreed deliveries.

The Office End.

Now that the operations at the site of the work are thoroughly mapped out and started we will deal with the office end of the proposition for a while.

The foreman can accomplish but little on the job if the "office" neglects its share of the work. We have left him on the work with a complete set of plans and specifications, an office locker, tool locker and plenty of tools, and we will assume that some "stock" materials are already arriving and being piled up for immediate and future use.

Among the "stock" materials above referred to would be such as follow: cement, crushed stone, common brick, sand, lime, boards, furring, studding, &c. A reference to the estimate sheets tells the quantities of all such materials, and a little work at the telephone will soon demonstrate who has the particular kinds you want. Get the prices, determine from whom you will buy and give orders for delivering certain quantities in a given space of time.

We neglected to state that we consider it necessary to install a telephone in the foreman's office at the building as soon as possible. We then instruct the foreman as to what has been ordered, as well as from whom, and as to what deliveries have been agreed upon, instructing him to see that the deliveries are kept up as agreed, using the telephone to that end and notifying the office if his telephoning does not bring results.

But to get back to the office end. Here the work should be divided in such a way that some one man is responsible for each particular job. If there are two or more partners there should be an immediate agreement as to who is to run the job in hand. We do not mean by this that the remaining partners should have nothing to say about the job. They should be advised of all matters of consequence which arise and a free discussion of the best course to pursue, under the circumstances, agreed

* Copyrighted, 1908, by Arthur W. Joslin.

upon. We all know that two or three heads are better than one. We simply mean that all matters pertaining to the job, whether they are with the architect, owner, city departments, material men, subcontractors or foreman, should be brought before the partner in charge of the job, and all orders, decisions, correspondence, &c., be attended to by the said partner. Several men cannot run one job successfully. There will be confusion in ordering material, conflicting orders given to the foreman and subcontractors, conflicting statements made to the architect or owners, the net result of which will be confusion on the work and loss of confidence of the architect and owners. You can ill afford to have either of the above conditions exist.

Should the builder, or firm of builders, have a superintendent in their employ and he be chosen to run any particular job, all orders and correspondence pertaining to the job should be attended to by him. Otherwise the foreman and other employees on the job and the subcontractors will not pay the attention to his orders that they should. It is not a necessity that the superintendent transact all the business of the job with the architect or owners, although no harm would be done if he is sufficiently diplomatic and entirely in your confidence. It is fair to assume, however, that a superintendent would refer more matters pertaining to the job to his employer or employers for a decision than would a partner. Especially would this be the case until such time as a superintendent had demonstrated to his employer his ability and fitness to handle all matters relating to the job.

The Man in Charge of the Job.

It now having been agreed upon in the office who is to handle the job we have in hand, the party chosen must begin his part of the work at once. A full set of plans and specifications should be on file in the office at all times, and if the building is of any size or at all out of the ordinary, a second set of plans is a great convenience, if not an absolute necessity. By having this extra office set you can lend the drawings to material men and subcontractors with whom you are doing business and not leave the office without plans of the operation. We have seldom seen the time when, the office set of plans being loaned, something did not come up before they were returned, which called for a reference to them. If the architect or owners will furnish only one set of plans and specifications we should buy the two extra sets. We have, however, never met a refusal from a reputable architect to furnish three or four sets of plans. As they usually have five or six sets printed to send out for bids, it is not an additional expense to them to supply the contractor's reasonable wants in this respect.

We find the most convenient way to keep plans in the office is flat in a drawer. Have a case of large, shallow drawers in the office and take a drawer for each job, labeling it and taking pains to put each plan back in the right drawer when through with it. It is a serious inconvenience to have to unroll plans and weight them down when using them, and the method described overcomes this objection, and is now in use nearly everywhere by architects, engineers and contractors. Another thing is to cut each sheet down to the smallest size possible, without cutting into the actual working drawing. This saves handling lots of superfluous paper every time you refer to the plans.

We left the foreman supplied with tools, help and some materials. It is now necessary to let the subcontracts, especially those for such parts of the work as will be soon wanted. Among these would be cut stone and steel and iron work. In all cases more or less work must be done on these materials before they can be delivered for installation in the building. The ⅛ or ¼ in. scale drawings, with such larger scale plans and sections as are usually a part of the contract drawings, are sufficient for taking off quantities, and the contracts should be made at once to permit the subcontractor to purchase such stock as may be required if he does not have it already on hand.

A contract should be drawn up with each subcontractor binding him to furnish certain materials at certain specified times (erected in the building if his contract covers erection), with a penalty of so much a day for failure to comply with the times of delivery or installation set forth in said contract. You will seldom have to pay any bonus if you take a little care in setting the dates, giving them just about as little time as it is possible in which to get out the material, and, if a part of their contract, to install it. What bonus you may have to pay will be money well spent.

While the subcontractors are figuring and before the job is a week old, you should carefully study the plan yourself and considering the total time allowed you, for the completion of the whole work, make a written schedule of the condition the job should be in each Saturday from start to completion, setting forth clearly what part of your own and each subcontractor's work should be done. Set your dates for subcontractors and deliveries of materials from this schedule. Keep the schedule in your desk and compare the condition of the job with it frequently and *make it a point* to keep the work ahead of the schedule. If you find you are behind on any particular part of the work, give particular attention to that part until you have caught up and are ahead.

Having thus laid out what *must* be accomplished in order to complete the work on time and knowing the quantities of material required, you can readily figure out about how many laborers, masons and carpenters should be employed to accomplish the required result. Don't forget to take into account bad weather. Provide the foreman with ample help and see that he is kept supplied with sufficient stock to work every man to advantage.

With the ordinary stock materials piling up on the site and the principal subcontracts let, you must now find time for scheduling dimension frame, window frames, &c., and getting your orders placed in time to have deliveries made that will permit of your keeping or beating your scheduled time.

Other matters must also have your attention. You and your subcontractors must have details and you must foresee those wanted first and take steps with the architect to get them. Don't request him to make them for you "as you will need them soon." Tell him that you *must have them at once* or the work will be seriously delayed. It is well to impart this information to the architect by letter, following the first letter with others if necessary, until such times as you get your details. If it gets to a point where you are actually delayed by his failure to furnish certain details, set forth clearly in a letter to him and claim an extension of time from date of letter until the drawings required are forthcoming.

By keeping copies of all your letters and preserving all of his in a file or files provided for the particular job in hand, information that may save you from trouble or lawsuits before the work is completed, accepted and paid for, is in your possession.

All of the office work enumerated above must be done at such times as not to interfere with other jobs you may be superintending, figuring or periodically visiting. The writer makes it a rule to visit one or more jobs every morning before going to the office, spend the middle of the day in the office (say from 10 a.m. to 2 or 3 p.m.) and then visit the same or other jobs in the afternoon before going home. Of course things will come up frequently that upset this routine and this plan must be changed to suit. Whatever comes up, work "under way" must not be neglected and you must plan to take care of it all in some way.

(To be continued.)

Oyster Shell Window Panes.

On the west coast of India is found a species of oyster, *Placuna placenta*, the shell of which consists of a pair of roughly circular plates about 6 in. in diameter, thin and white. At present these oysters are collected for the pearls which they often contain, although few are fit for the use of the jeweler. But in the early days of English rule in India, says a writer in the *Youth's Companion*, the shells were employed for window panes. Cut into little squares, they produced a very pretty effect, admitting light like frosted glass. When the Bombay Cathedral was built, at the beginning of the eighteenth century, its windows were paned with these oyster shells. In Goa they are still thus employed.

SOME INTRICATE PROBLEMS IN FRAMING.—III.

BY C. J. MCCARTHY.

THE method of groining on a circular plan is indicated in Fig. 9 of the illustrations. The ribs are described in the same manner as shown in connection with the figures already presented, the lines from the ordinates *a b c d* of the body range being portions of circles drawn from the same center as the lines of the plan. The to them, the curve 6 5 3 4 T drawn through the points thus obtained is the bevel of the rib.

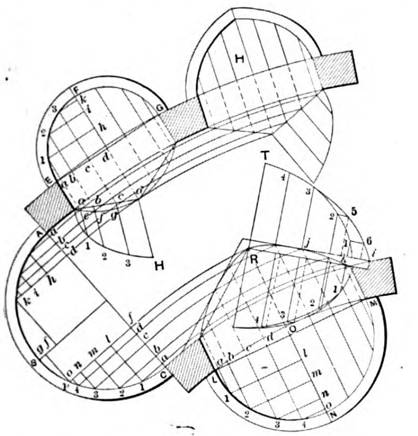


Fig. 9.—Welsh Groining on a Circular Plan.

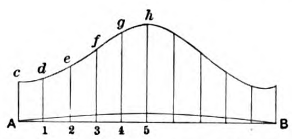


Fig. 10.—Development of the Covering of the Vault L R N.

The development of the covering of the vault L R N is shown in Fig. 10, and requires no further description than has already been furnished in the foregoing figures.

The next subject to be considered is the method of drawing a Gothic groin in which the transverse axis or the apex of the intersecting vault is a curve joining the summit of the side arch to the summit of the body range. Referring to Fig. 11, let A B C be the arch of the body range, I K L the side arch and S S′ the section on the

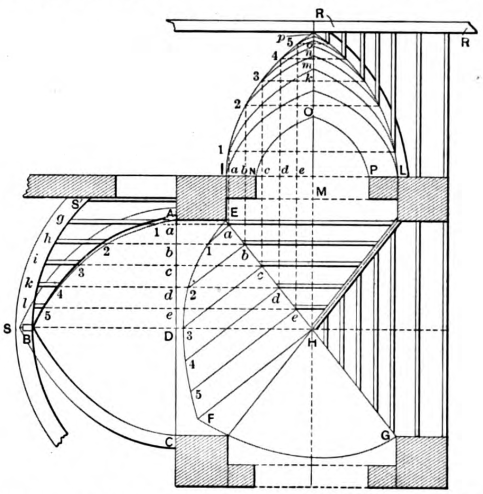


Fig. 11.—A Gothic Groined Vault with the Summit of the Side Arches Joined to the Summit of the Body Range by a Curved Ridge.

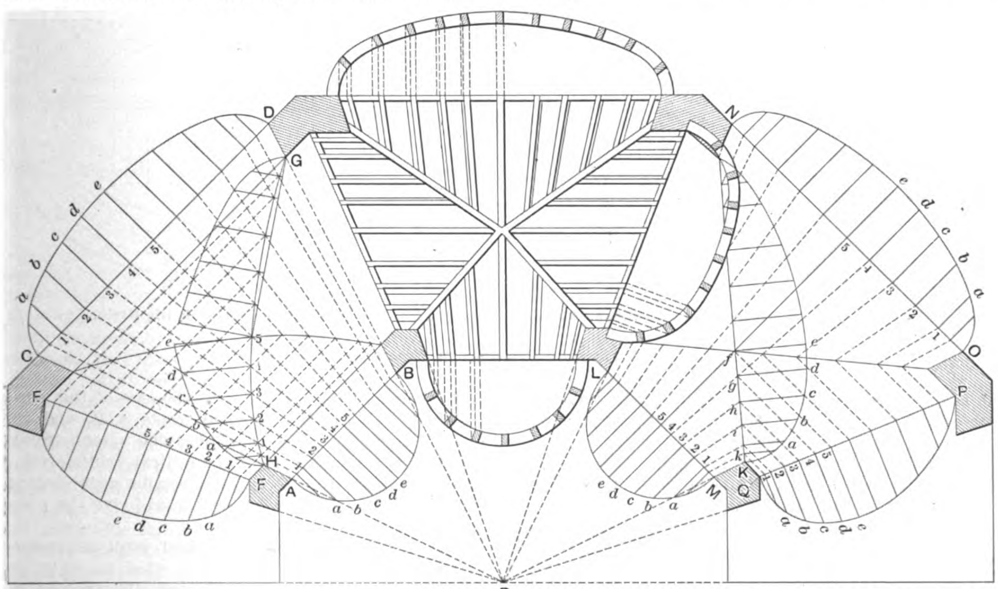


Fig. 12.—Diagrams Showing Groining on an Octagonal Plan.

Some Intricate Problems in Framing.—III.

lower half of the plan shows the method of backing or beveling the intersecting ribs. Dotted perpendiculars *i* 6, *k* 5, &c., are drawn from the intersection of the curved lines *a i*, *o k*, *c g*, &c., with the tangent of the curve R S of the intersecting rib on the plan, and the hights of the ordinates corresponding being transferred axis H M. Draw the diagonal E H G and divide it into equal parts in *a*, *b*, *c*, *d*, *e*, H. Through these points draw perpendiculars to both axes and produce them indefinitely. Then to find the spandrels transfer the hights *a* 1, *b* 2, *c* 3, &c., of the body range to the corresponding ordinates on the line I L for the arch I R L; and to find the intersections of the ribs 1 *g*, 2 *h*, 3 *i*, &c., with the body rib A S, transfer the hights *a g*, *b h*, *c i*, *d k*, *e l* to the line M R in *k*, *m*, *n*, *o*, *p*; then 1 K, 2 *m*, 3 *n*, 4 *o*, 5 *p*, &c., will be the curve of the spandrel rib *i g*, 2 *h*, &c.

The diagonal or intersecting rib is found by transferring the hights of the ordinates of the body range to the ordinates, *a* 1, *b* 2, *c* 3, &c., of the diagonal rib.

In Fig. 12 we consider the method of groining on an octagonal plan. In the left hand compartment of that figure the groin is regular, and the mode of procedure will be readily understood from the descriptions already given. The chords of the arches are divided into the same number of equal parts, and the corresponding divisions are joined by lines whose intersections give the seats of the intersecting ribs, which in this case are represented by curved lines.

The thickness of the stuff required for the intersecting

We will now proceed to describe the method of finding the angle ribs of a cono-cylindric groin. Referring to Fig. 14 let A D B be the conic arch, C E the axis of the cone and E its apex; also let L K be the diameter of the cylindric arch and *r* M *a* its axis. Draw the seat of the intersecting rib F M G, also the line *m* G, and the seats of the diagonal ribs F G and N O. Divide the semicircle L 4 K into any number of equal parts, 1, 2, 3, 4, and draw the ordinates 1 *u*, 2 *t*, 3 *s*, 4 *r*, &c. Then from the points of intersection of the ordinates with the line L K draw the lines *u n m*, *t o l*, *s p k*, *r* M *a*, &c., parallel to the axis *r* M *a*. At the points where these intersect the seat of the diagonal rib, draw ordinates *n* 1, *o* 2, *p* 3, M 4, &c., equal to the ordinates of the side arch, which will give the curve required, or from *m*, *l*, *k*, *a* and the remaining points of intersection in *m* G let fall perpendiculars to A B, meeting it in *i*, *h*, *g*, *b*, &c. From the point 4 in A B, as a center, where the perpendiculars

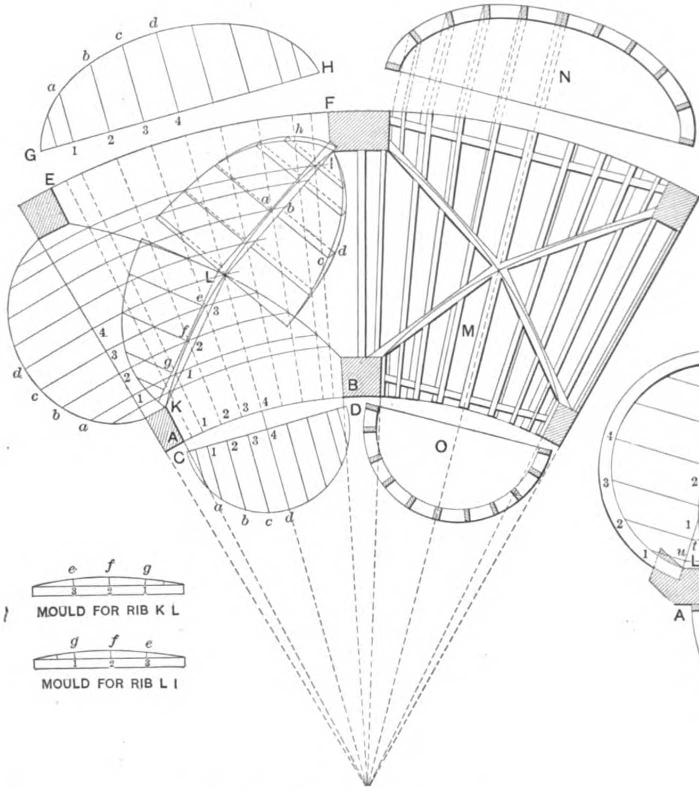


Fig. 13.—Groining on a Circular Plan.

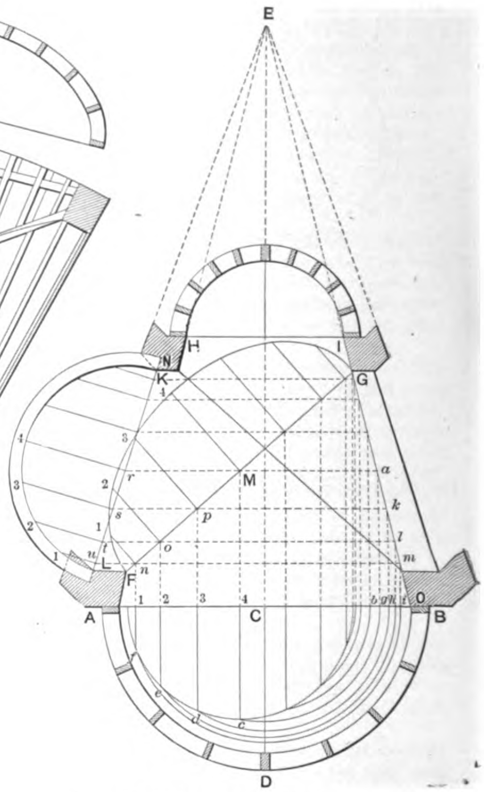


Fig. 14.—A Cono-Cylindric Groin.

Some Intricate Problems in Framing.—III.

rib is found in the same manner as shown in the description of the Welsh groin in Fig. 7, by drawing chords and tangents to the curved lines of the plans.

The center compartment of the figure shows the manner of finding the lengths and positions of the jack ribs.

The right hand compartment shows the method of finding the curve of the rib of the body range and diagonal rib, when the seats of the intersecting ribs are straight lines instead of curves. It is self-explanatory and should be readily understood by inspection.

A further description of groining on a circular plan is given in Fig. 13. The corresponding ordinates in this figure have the same letters and numbers attached, so that a mere inspection of the figure will be sufficient to show the method of finding the lines. The methods of describing the molds for the under side of the intersecting ribs K L and L I are shown in the lower left side of the figure. The manner of backing the intersecting rib is as before described. At M N and O are shown the manner of arranging the jack ribs.

let fall from the intersection of the axis of the side arch with the seat of the diagonal meets A B, and with a radius equal to *r* L or *r* K, describe a semicircle; and from C, where the axis of the conical vault meets A B, with the radii C *i*, C *h*, &c., describe arcs cutting the semicircle in *f*, *e*, *d*, *c*, &c., which will give the places of the ordinates.

In Fig. 15 we have a speroidal vault intersected by two Gothic vaults crossing each other at right angles. To find the curve of the different ribs proceed in the following manner:

Let A B C be the profile of the side arch. Bisect A C in D and draw D B and A *d* perpendicular to A C; join A B. Divide the line A B into any number of equal parts, and from D draw lines through the points of division 1, 2, 3, 4, cutting the profile of the arch in *e*, *f*, *g*, *h*, and from B draw lines through these points, meeting the line A *d* in *a*, *b*, *c*, *d*.

Then to find the curve of the diagonal ribs L, L, G, proceed as follows: On K H, the seat of the center rib, raise the perpendiculars K I and H *d*. Make K I equal to D B, and transfer the divisions A, *a*, *b*, *c*, *d* of the line A *d* on the side arch to the line H *d*. Join I H, and divide the line into the same number of equal parts as the line A B. From K draw the lines K 1, K 2, K 3, K 4, produced indefinitely. Join I *a*, I *b*, I *c*, I *d*, and through the intersections of the two series of radial lines draw the curve of the rib H *e f g h* I.

The side rib G F E is found in the same manner. A vertical section of the drop or pendant is shown at M *m* M.

Cleaning Stonework.

It is a customary operation on the completion of a building to clean down the stonework in order to free it of stains due to mortar, &c. While this would appear rather necessary it is undoubted that in so doing an amount of evil is wrought, which, if prevented otherwise, would give a considerably longer existence to the

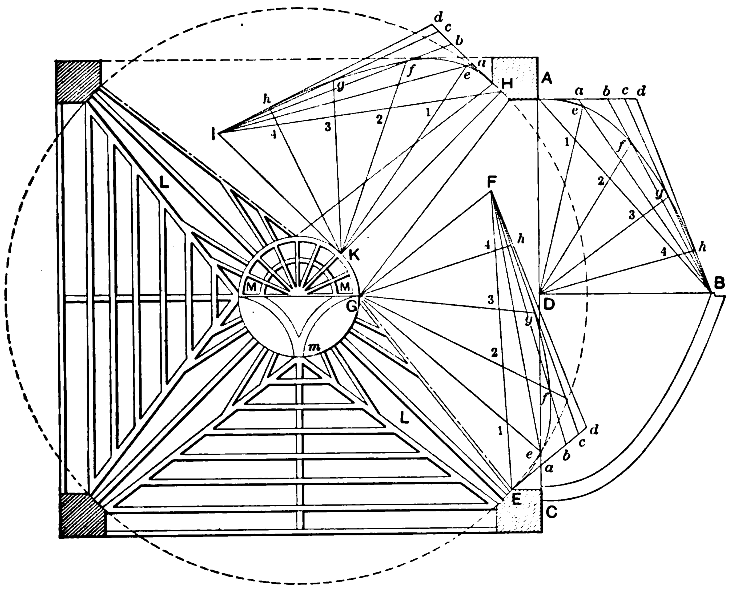


Fig. 15.—A Spheroidal Vault Intersected by Two Gothic Vaults at Right Angles and Having a " Drop " in the Center.

Some Intricate Problems in Framing.—III.

stone and prevent the enormous amount of deterioration that exists at present.

It is often argued that the decomposition of stone is entirely produced by the weather, but it is worth while to point out that there are a number of details which, if overlooked, assist the weather considerably in its work. The stone on being taken from the quarry at once undergoes a process of hardening, which is explained by some writers as being due to an amount of quarry water contained in the stone being drawn to the surface when the block is exposed. As this water contains a small amount of siliceous, calcareous, ferruginous or clayey matter, which naturally forms a species of thin crust on the face of the stone as the water itself evaporates, it thus acts as a cementing constituent and strengthens the identical parts which will be first attacked by the weather.

Now it can be quite easily seen, says a writer in an English exchange, that if this crust is removed after some weeks or months the source from which it is derived has been in the meantime taken away, and the stone is unable to again form another hardening surface to replace the old one, and we are thus led to notice the detrimental nature of many of the methods adopted in cleaning stonework. There are cases, for instance, where washes containing a portion of muriatic acid in a solution of water are used in order to remove the mortar stains. They may remove these discolorations, but destroy the protective crust and put into the grain of the stone the very substance which, if it were present in the atmosphere of a smoky town, would prove itself a formidable enemy. It will also be seen that the more common practice of scouring the surface with sandstone and water must also remove the crust, if it does not obliterate stains, although it has not the same detrimental chemical effect; and the same argument could be applied to the rest of stone cleaning preparations, Ransome's process being perhaps an exception. In this case the loosening of the crust is evidently appreciated and two solutions are therefore used, one being applied to remove the stains and a second one applied later in order to try to form an artificial waterproof covering. It must, however, be admitted that, if it is possible to leave the natural waterproofing on the stone, it will be a considerably better plan.

It is curious to note the modern tendency exhibited in patents on this subject; instead of the claim that any particular solution or abrasive matter brings down the stains to a minimum, the chief point of advocacy seems to be that the patent material is the hardest abrasive. In fact, one of the latest patents (an American one, by the way) publishes with a certain amount of pride that the material is only exceeded in hardness by diamonds. Now if mortar discolors stone work in the building it should be evident that if this is kept back from the face of the stone and the work afterward pointed with a nonstaining mortar consisting chiefly of plaster of paris, lime and marble dust, this would, combined with careful workmanship, go a long way to prevent the necessity for the use of anything more than brush and water to remove stains.

A case not without interest, in which the stone began to show a brownish discoloration due to absorption of unclean water from the mortar, was that of the Capitol at Washington. The discoloration occurred in the lower courses of the stonework, but was effectually overcome by placing a thin coating of asphalt on the surface which came into contact with the mortar on the face. The bearing of careful design and workmanship upon deterioration is illustrated perhaps most effectually in a structure designed by one of America's greatest architects, which was given the credit of being of more than ordinary merit. The walls are of massive granite, while the window sills, caps, cornices and other projections, which are, of all parts of the structure, most liable to injury from disintegration, are of soft sandstone. Evidently the items of cost and color were here exclusively considered, but it is obvious that in course of time it will be necessary to resort to scouring or other means of freshening up the appearance of the building, and this will remove any surface hardening which the stone may have.

PORTABLE churches are now being made as well as portable schools, the idea being to use them until it is developed whether there is a sufficient field to justify building a permanent structure in new communities.

THE Interstate Cement Tile Manufacturers' Association will hold its third annual convention at the Armory, Minneapolis, March 3. A large attendance is expected as the work of this association is rapidly growing more important to its members.

ARCHITECT'S RIGHT TO FEES WHEN BUILDING IS DESTROYED.

ORDINARILY, the fees of an architect are payable in accordance with the terms of his contract. It occasionally happens, possibly through an oversight on the part of the contracting parties, that the contract does not state the date of payment with sufficient exactness, or some contingency arises that was not provided for, and the question of fees then becomes one for a court of law to determine. Such a case arises where the contract provides that the architect's fees for preparing plans, specifications and details, or the final installment thereof, shall be payable a certain number of days after the completion of the building, and the building burns down before completion, without fault on the part of either party, says John E. Brady in the *Record and Guide*. Is the architect in such event entitled to compensation? He has done all that the contract required of him, for we are supposing a case in which the architect does not agree to supervise the construction work, and he has at least a moral claim to his compensation or the portion of it still unpaid. He has had the labor and expense of preparing the plans and the owner has had the use of them until the destruction of the building.

The owner, on the other hand, may choose to stand upon the strict provision of the contract and claim that the architect is not entitled to compensation for the reason that the destruction of the building has made impossible the occurrence of the contingency upon which the fees are payable, namely, the completion of the work. But does it now lie within the power of the owner to say to the architect, "Your compensation is, by the terms of our contract, made payable upon the completion of the building. The building has been destroyed, through no fault of mine, making my operation a total loss and rendering it impossible to complete the work. Therefore, you have no right to compensation." For answer it is necessary to turn to the decisions for cases based on analogous facts.

Rule Regarding Agreement.

The rule seems to be that the agreement will be construed so as to accord to the intentions of the parties. If, for instance, it could be said that the parties intended that, in event of the destruction of the building before completion, the architect should not be compensated for the skill and labor expended, then the court should rule accordingly. If, on the other hand, in stipulating that payment should be made a certain number of days after the work was finished, the parties were merely fixing a convenient time for payment, then the court will find that the possibility of the destruction of the building was something which the parties did not have in mind at the time of the making of the contract, and will hold that their implied intention was that payment should be made, in such event, within a reasonable time. As was said in the case of DeWolf *vs.* French, 51 Maine 420, where the parties intend that the debt shall be absolute, "and fix upon the future event as a convenient time for payment merely, as where a drover purchases cattle, promising to pay for them on his return from market, overlooking the contingency that he may never return, then the debt will not be contingent; and if the future event does not happen as contemplated, the law will require payment to be made within a reasonable time. The parties having neglected to provide for such a contingency, the law in this, as in many other cases, supplied the omission by implying such a promise as is necessary to do justice between the parties—such as we may fairly assume would have been made in fact, if the contingency had been thought of. In fixing upon the happening of a future contingent even as the time when the money is to be paid, the parties intend to make the debt a contingent one, and the event never happens, the creditor's right to recover it will never accrue. But, if the debt is understood to be absolute, and the happening of the future time for payment merely, and, for some unforeseen, or unthought of cause, the event never happens, the creditor's right to recover will not be defeated—the law will require the payment to be made within a reasonable time after it is ascertained that the event will never happen. The debt will be contingent or otherwise, depending on the intention of the parties."

In the case referred to the plaintiff sued for services rendered in securing freight for a certain vessel. Under the agreement the services were to be paid for upon the return of the vessel with a cargo. In the action which was brought to recover compensation for the services the defense was interposed that the vessel had been lost at sea and it was claimed that as it was therefore impossible for it to return with a cargo no compensation was legally due. But it was held that the parties did not intend to make the claim a contingent one, which would not accrue in event of the loss of the ship, but that, in naming the time of the return as the time when payment should be made, the parties had entirely overlooked the possibility of the ship being lost and had made no provision for such a contingency. Under such circumstances, it was held that the law would imply a promise to pay within a reasonable time after it was ascertained that the vessel had been lost.

In another case (Upson *vs.* Holmes, 51 Conn. 500) it appeared that the defendants had purchased from the plaintiffs all the wood standing on a certain lot, estimated at about 500 cords, at a certain price per cord. It was agreed that payment should be made after the wood had been cut and measured. The plaintiff had declined to do the cutting and hauling, and a third person by the name of Carter was secured for that part of the work. After the wood had been cut and a part of it hauled the remainder was destroyed by fire, neither party to the contract being at fault. The defendants claimed that, inasmuch as payment was to be made after the wood had been measured, and as it had not been and, under the circumstances, could not be measured, they were not liable for damages. It was held, contrary to this contention, that the fact that the contingency upon which payment had been fixed could not occur would not deprive the plaintiff of his right to recover, and that the plaintiff was entitled to a verdict based on the estimated amount of wood involved in the sale.

Decisions Cited.

There are many other similar decisions. Thus it was held, where a party had agreed to pay a sum of money as soon as a certain crop could be sold or as soon as the money could be raised from some other source, that he was bound to pay within a reasonable time. The case is that of Nunez *vs.* Dantel, in which the court said: "No time having been specified within which the crop should be sold or the money raised otherwise, the law annexed as an incident that one or the other should be done within reasonable time, and that the sum admitted to be due should be paid accordingly. . . . It could not have been the intention of the parties that if the crop were destroyed, or from any other cause could never be sold, and that defendant could not procure the money from any other source, the debt should never be paid. Such a result would be a mockery of justice."

And where a note, which was given for the price of the rigging of a vessel provided for payment "ninety days after its first return trip," and the vessel was lost on its first voyage, the decision was that the note was payable 90 days after the time reasonably required for the trip. "It would be a mockery of justice," said the court, "to hold that because the schooner was lost at sea, and, therefore, had not made her first return trip, the appelee lost his debt." (Randall *vs.* Johnson, 59 Misc. N. Y. 317.)

So, while it would be well for an architect, who contracts to prepare plans and to wait for his fees until the completion of a building, to see to it that a clause is written into the contract protecting him in case the building is destroyed or is not finished for some other reason, the absence of such a provision does not affect his right to collect his fees where the unexpected happens and the building is not completed.

PLANS have just been filed with the Bureau of Buildings, New York City, for a group of 19 elevator apartment houses of French Renaissance design, to be built at a cost of $2,797,000, on Washington Heights.

CASTING A PLAIN PLASTER COLUMN.

By William Gregory.

A PHASE of the plasterer's work which will probably interest many readers of the paper, and especially those who are members of the trade in question, is the running of a reverse mold for casting a plain plaster column, such, for example, as for encircling iron, brick or concrete columns. Fig. 1 of the drawings shows the complete design for the column, while Fig. 2 indicates the construction of the reverse mold for casting it. In this illustration A represents the profile of the casting mold for a half column and B the running mold for it. In Fig. 3 is a perspective view of the reverse or casting mold ready for casting one-half of the shaft.

As it is not possible to run the base, shaft and cap in one operation, we will run the shaft first, then the base, astragal and cap separately and plant them on; although they can be run and fixed to the profile of the shaft and so cast a complete half of the column in one operation if such a method of procedure seems desirable.

In making the mold for running the profile of the shaft great care must be taken in cutting the zinc to an exact half of the circle so as to insure a neat fitting burlap or excelsior soaked in liquid plaster. We may then put on a few other wads of burlap near the center. Having rendered the first half correct we shall have little difficulty in fixing the second half in its correct position by keeping it tight up against the first half, taking care to fasten it well at the bottom by dropping a few wads of burlap from the top and securing the two together at

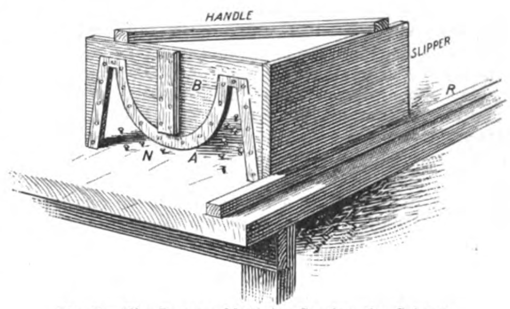


Fig. 2.—The Reverse Mold for Casting the Column.

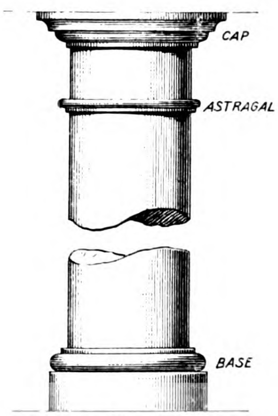


Fig. 1.—View of Column.

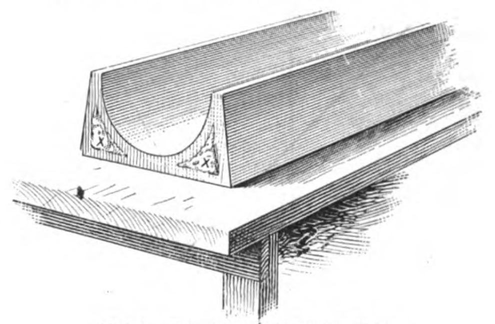


Fig. 3.—Perspective of Casting Mold.

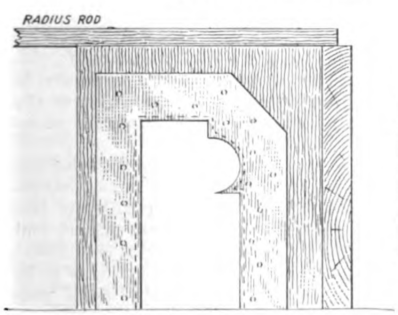


Fig. 4.—Mold for Base.

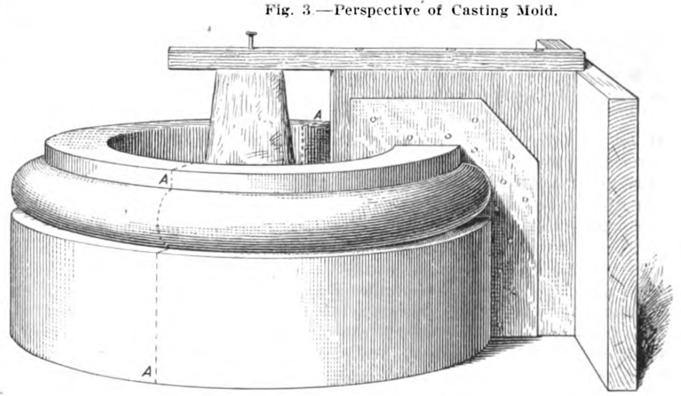


Fig. 5.—Method of Running Mold on the Bench.

Casting a Plain Plaster Column.

column. First make a good straight level bench; tack a running rod R near the front edge, Fig. 2, and drive a few nails in the bench at N to prevent the mold from lifting in the swelling of the plaster. Many methods will suggest themselves to the plasterer for placing a false core in the mold at X X in Fig. 3 for the purpose of saving plaster.

In order to run the base a mold must be made as in Fig. 4. Run this on the bench as in Fig. 5, afterward cutting it through the center as along the dotted line A A A. Plant this base at the foot of the iron column, taking care that it is level and in correct position. Next take one of the halves of the shaft, place this on the base and with plumb line and gauges fix it up temporarily before fastening it. Having placed it in its correct position, fasten the top and bottom on each side with the top with burlap. Point up the joint with plaster and leave a clean job.

Having made the running mold for the cap and run it on the bench as we did for the base in Fig. 5, we proceed to fix the cap in position on top of the shaft by placing one-half in correct position and fixing the other tight against it, taking care to keep an equal margin all the way around the shaft and underneath the bottom member of the cap.

The astragal mold will be run similar to Fig. 5 and fixed into position. An experienced plasterer will make molds for the base, astragal and cap and run the three on the bench with one gauging, thus saving considerable time. Let the work stand for a few days to dry, then rub down with fine glass paper, and we have a complete column as indicated in Fig. 1.

SOME PROBLEMS IN STAIRBUILDING.—V.

BY MORRIS WILLIAMS.

BEFORE advancing further with examples of stairways containing cylinders, it may be advisable to explain the fundamental lines used in the solutions of the problems that are invariably encountered in cylindrical stairway construction. The body of the construction—that is, the stairway itself containing as it does the stringers, cylinders and steps, embodies a very small item comparatively speaking of the difficulties pertaining to the successful treatment of the entire construction. The prime necessity in this connection is a knowledge of the right place to locate the risers in and adjoining the cylinder. When this is correctly accomplished the manipulation of the winding rail with "wreath" is considerably simplified, and when in position over and above the plan curve and that of the stringer it will present a more graceful and pleasing appearance as well as uniformity in hight, all along the length of the curve relatively to the nosing line of the steps in and around the cylinder.

forming the rectangular portion marked section No. 1 in the figure. This section represents the real size and form of the oblique cut made through the block along the line *b′ c″*.

In Fig. 37 is represented an oblique view of the block showing the sectional cut above described. In this figure is shown that the side *b′ c″* is sloping downward from *c″* to *b′*, and that the side *b′ a′* is level or horizontal. If we consider *b′ a′* to be a level tangent of a wreath, *b′ c″* a raking tangent, and *b′* to indicate the angle between the two, it is evident that we have in Fig. 36 a method by which to solve the problem of finding the length of the tangents, as well as the angle between them as required in the face mold to give the right direction to the tangents to square the joints of the wreath at the ends *a′* and *c″*.

Nothing can be more simple than the method shown in Figs. 36 and 37 to solve the problem of face mold tangents where one is level and the other is inclined. It is solved by merely constructing the oblong figure marked "section"; two sides being made equal to the side of the square plan and the other two sides made equal to the raking line *b′ c″* of the elevation, which in hand railing construction generally represents the pitch of the stairs.

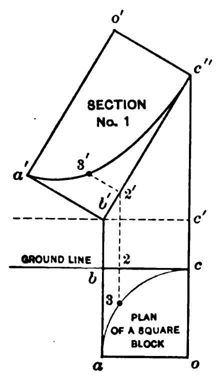


Fig. 36.—Diagram Showing Method of Developing a Section Through a Square Block Oblique in One Direction to Its Axis.

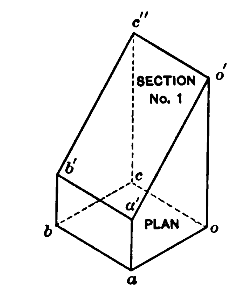


Fig. 37.—A View of the Block Shown in Previous Figure.

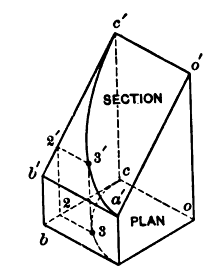


Fig. 38.—Another View of the Block Shown in Fig. 36.

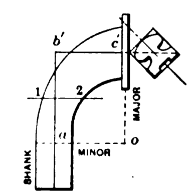


Fig. 40.—Face Mold Showing the Use of One Level Line to Draw the Curves.

Some Problems in Stairbuilding.—V.

If, on the other hand, the risers are placed haphazardly a considerable waste of time and labor is caused in the manipulation of the wreath, and at best the ultimate end of such arrangement of risers will be what is known as a "crippled" rail.

To lay out winding rails or "wreaths" is not such a puzzling matter as most mechanics appear to imagine. With a knowledge of a few problems which are the fundamental basis of all the various systems of hand railing the work becomes as easy as any other which the carpenter is called upon to perform. For example, consider the "face mold" containing as it does the tangents and curves of the mold. The problem as regards the tangents is merely to find the length of each and the relative direction of one to the other—that is, the angle between the two. As regards the curves, the problem is merely to find the length and form. Both of these problems are as easy to solve as many others which arise in the routine of almost every day practice. Once an insight is obtained to a constructive system of lines that will surmount the solution of these two problems we may almost say that we have mastered the science of geometrical hand railing.

A few diagrams which follow illustrate the solutions of these problems. In Fig. 36 is shown a plan and elevation of a square block which as indicated at *b′ c″* of the elevation is cut obliquely to its axis in one direction. The problem is to find the shape of the sectional cut made through the line *b′ c″*.

From *b′* draw *b′ a′* at right angles to the oblique line *b′ c″*; also from *c″* draw a similar line to *o′*. Make both lines equal in length to one side of the block, as shown on the plan at *o a* or *a b*. Connect the points *a′*, *o′*, thus

In Fig. 36 we have inscribed a quadrant curve to represent the plan of center curve of a wreath, merely to show what a simple process it is to transfer it to the section and thus lay out the center line of wreath as required on the face mold.

The plan curve is drawn from the center *o* with the radius *o a*. To develop this curve on the section, which is the problem in hand railing when it is required to find the center line of a wreath having one level tangent and another inclined, all that it is necessary to do is to locate one or any number of points on the plan curve, as at 3; project it as shown to cut the pitch line *b′ c″* in 2′; then draw the line 2′ 3′ parallel to *b′ a′* and make it equal in length to the line 3 2, shown in the plan.

We now have on the section three points—namely, *a′*, 3′, *c″*, which are contained in the curved center line of the face mold. By tracing a curve to touch these three points the development of the center line is accomplished, as shown upon the section from *a′* through 3′ to *c″*.

In Fig. 38 is shown another view of Fig. 36, containing in addition to the tangent lines, which alone are shown in Fig. 37, the plan curve of the center line of the rail and also its development upon the section. By comparing each line and point in the diagrams, Figs. 36 and 38, which may be easily done by means of the reference letters, Fig. 38 will clearly prove the correctness of the method shown in Fig. 36 of developing the curve of the center line of the face mold. The knowledge conveyed by these figures amounts to a great deal in the construction of curved hand rails or wreaths.

Where a cylinder is placed at the bottom of a stairway or at the top, for that matter, the wreath winding around it from the pitch hand rail of the stairway to the level hand rail of the landing will have tangents similar to those shown in the diagrams already presented—namely, one tangent level and the other inclined.

The same condition of tangents is also to be met with in what are called half space platform stairways where one flight extends from the first floor to a platform, and another flight extends from the platform to the second floor, both flights connecting with a cylinder at the platform.

We will now apply the principles involved in the demonstration of these figures to a hand rail construction, and will take for an example a case similar to the one above mentioned—namely, a hand rail to wind around a cylinder placed betwten two flights meeting in a half space platform. A partial plan of such a stairway is presented in Fig. 39, where also is shown a plan of the rail around and adjoining the cylinder.

It will be observed that the plan of the cylindrical rail is a semicircle or half a circle, and that the center line is inclosed within straight lines, which are the plan

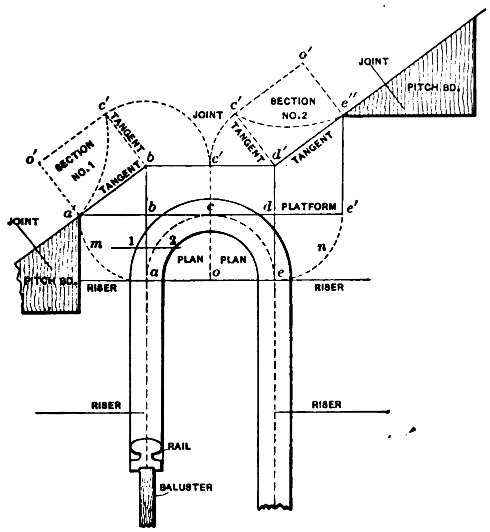


Fig. 39.—Plan and Elevation of Tangents for a Half Space Landing Stairway.

Some Problems in Stairbuilding.—V.

tangents. The line *b a* is tangent to the curve at *a*. The lines *b c* and *c d* are both tangents to the curve at *c*, and the line *d e* is tangent to the curve at *e*. The lines *b c* and *c d* are called "crown tangents," because they touch the crown of the center curve of the rail. The other two tangents are known as "side tangents." The geometrical definition of a tangent is "a right line which touches a curve, but which when produced does not cut it."

The writer has deemed it necessary to give this detailed explanation of the tangents, owing to these lines having so much to do in the development of hand rails generally. The plan of the cylinder rail as it now appears in Fig. 39 shows it to contain two distinct quadrant curves, each inclosed within a square. The first quadrant *a c* is shown to be inclosed by the tangents *a b* and *b c*, and also the springing lines *o a* and *o c*.

If we compare this quadrant and the square inclosing it with the lines composing the plan of a square block, as shown in Fig. 36, we will find that the two are identical. The other quadrant *c e* in Fig. 39 and the square *o d e o* inclosing it is also identical.

At *a* in Fig. 39 is shown the landing riser of the bottom flight, and at the opposite side *e* is shown the starting riser of the upper flight. The winding rail, therefore, will be the hight of one riser higher at the point *e* than at the point *a*, which indicates the pitch of the winding rail over the complete cylinder from *a* to *e*.

In Fig. 39 is also shown how to draw the elevation of the tangents for the purpose of finding their true length and inclination. Turn the side plan tangent *a b* to align with the crown tangents *b c d*, as shown at *a' b*. Again turn the other side plan tangent *e d* to align with the same crown tangents as shown at *d e'*.

Now upon *e'* erect the line *e' e''*, the hight of one riser. At *e''* place the pitch board of the top flight and continue the pitch to *d'* as shown. Duplicate the same process on the other side of the cylinder by placing the pitch board of the bottom flight at *a'* and continue the pitch as shown to *b'*. Now draw a level line from *b'* through *c'* to *d'*, which will complete the elevation of the tangents.

It will be observed that the elevation of the side plan tangent *a b* is the pitch line *a' b'*, and that the elevation of the crown plan tangent *b c* is the level line *b c'* directly above it, and that these two tangents, one inclined and one level, belong to the bottom part of the wreath extending from *a* to *c*, which is half of the cylinder. The tangents of the other half are shown to be precisely the same in length and relative pitch, namely, one level and one inclined, as shown from *c'* to *d'* and from *d'* to *e''*.

The problem now is to find the angle between these tangents as required on the face mold to square the joints of the wreaths, and it is here that the method shown in Fig. 36 to find the form of a section cut obliquely through a square block to one side of its axis becomes available to solve the problem of face mold tangents in hand railing where one is level and the other inclined.

It is shown in Fig. 36 that this is done by drawing the rectangular section *a' b' c'' o'* with two of its sides equal to the oblique cut *b' c''* and the other two sides equal in length to *a b*, which is one side of the base or plan of the block, all angles in the section being right angles.

The two sections *a' b' c' o'* and *c' d' e'' o'*, respectively, shown in Fig. 39 for hand rail tangents, exhibit a similar mode of operation. In these sections it is shown that the sides *a' b'* and *o' c'* of section No. 1 is made equal to the pitch line *a' b'*, which represents the inclination of the plan side tangent, *a b*. The other two sides of the section are made equal to the length of the level tangent *b' c'*, which also is equal in length to either side of the plan tangents *a b* or *b c*.

Section No. 2 is a duplicate of Section No. 1 and similarly formed, being composed of two sides equal to the inclined tangent *d' e''*, and of two sides equal in length to the level tangent *c' d'*. The angle between the tangents, as shown in the section, is a right angle.

What we learn from these operations in respect to hand rail construction is that in all cases where one tangent is level, and the other inclined the angle between the two as required on the face mold will be a right angle; also that the method to lay out the tangents of the face mold is simply to draw one at right angles to the other, having previously found out the exact length of each from the elevation.

For example, the face mold shown in Fig. 40 is the one required for the two wreaths to stand over and above the cylinder in Fig. 39, and because the elevation of the tangents is as above, all that is necessary is to form a rectangle as indicated in Fig. 40, making two sides of it equal to the level tangent and the other two sides equal to the pitched tangent. The angle at *b'* in Fig. 40 will be the angle between the tangents as required to spare the joints at the ends *a* and *c'*, respectively, and is shown to be a right angle. The other two lines composing the rectangle are called the "springing" lines, and because one of them, *o a'*, is parallel to the level tangent *c' b'*, it becomes a level line; and furthermore because it is a level line from the center *o*, it will be the minor axis of the ellipse that constitutes the inside and outside curves of the face mold. It will be observed that point *o* being the center of the plan rail, as shown in Fig. 39, becomes the center also of the elliptical curves of the face mold as shown in Fig. 40.

Having found in the manner shown in the preceding operation the length and angle between the tangents of the face mold as now presented in Fig. 40, it will be further required in order to complete the mold to draw the inside and outside elliptical curves. In the view of the block shown in Fig. 38 it is clearly indicated how the curves may be drawn by means of level lines or "ordinates." It is there shown that the line 2 3 on the plan is a level line, also that the line 2′ 3′ right above it on the section is a level line. The point 3′ on the face of the section is a point contained in the elliptical curve upon the face of the section that will stand over and above the circular curve of the plan. It is evident that any number of these points on the face of the section may be found by using more level lines for the purpose and that the more points used the more correct will be the elliptical curve.

In Fig. 40 the directing level line is the level tangent *c′ b′*. If we draw lines parallel to this line across the tangent line *a b′* and make them equal, respectively, to level lines drawn across the plan tangent *a b* and parallel to the plan level tangent *b c*, as shown in Fig. 39, the elliptical curves of the face mold may be determined. For example, let the line 1 2 across the plan tangent *a b* in Fig. 39 be a level line. To be so it must be drawn parallel to the plan level tangent *b c* as shown. For convenience we have placed it right in the center between *a* and *b*.

Now draw a line 1′ 2′ parallel to the level tangent *b′ c′* in Fig. 40 and directly in the center of the line *a b′*. Make it equal in length to 1 2 of Fig. 39. The points 1 and 2 thus found in Fig. 40 will be contained in the curves of the face mold.

In succeeding articles the writer will draw a few of the face molds complete by this method, but enough has been here presented to show the principles involved in the use made of level lines for the purpose. A good example of this mode of operation was shown in the December issue of *Carpentry and Building*, where was given a face mold to be drawn by means of level lines or "ordinates" for a quarter turn stretchout rail at the bottom

For a wreath of the example represented in the preceding figures, there is no trouble whatever to find the bevels to twist it; because in all cases where one tangent is level and the other inclined, the bevel invariably will be found at the top angle of the pitch board where the pitch and riser intersect.

THE STRENGTH OF WOOD AND OF CONCRETE.

BY ERNEST MCCULLOUGH, C. E.

THE advent of reinforced concrete as a building material is causing a great many carpenters and builders to take notice, and some feel almost hopeless because it means going to school again. They have been so long in the harness that intuitively they know the best thickness of board or plank to use to obtain a certain strength. They will have to figure out reinforced concrete, and many do not feel capable of doing so, even though the present day literature is extensive. So they oppose the new material, albeit with many a heartache, because it is easier to stick to things one knows. Nay, it is best always to stay with what one understands.

However, the writer to date has seen no comparisons made of wood or reinforced concrete in such a way that the intelligent worker in wood could substitute if he desired. It is the purpose of this article to give this information, so that a man can tell how thick a slab to use of reinforced concrete when he knows the board or plank that would do the work. With this information in his possession the average country carpenter should be able to put in porch floors that will never rot, put in good sidewalks over areaways, &c.

Strength as Affected by Shape.

To begin, the shape of a piece of material has an effect upon its strength, and the mathematician by working the different factors out by algebra and higher mathematics has obtained what is known as a "section modulus." The worker in wood is concerned only with the section modulus for a rectangular section of uniform material. This section modulus is $\frac{b\,d^2}{6}$. It means that we multiply the depth by itself and this product by the breadth and divide the total result by 6. When this final total is multiplied by the strength of the material in pounds per square inch we obtain what is known as the "moment of resistance." Using the letter "f" for the fiber stress, the full expression for moment of resistance becomes

$$M = \frac{f\,b\,d^2}{6}$$

However, we are not going into the question of moments and such things further than to illustrate how we get to a point where we can compare wooden beams, boards and planks with reinforced concrete. As wood is ordinarily used the fiber stress is about 1200 lb. per square inch, so that our expression for a wooden beam becomes $M = \frac{1200\,b\,d^2}{6}$. We can divide the fiber stress and obtain then a factor known as *K*, thus 1200 ÷ 6 = 200, and we then have $M = 200\,b\,d^2$, the 200 being the factor *K*.

All formulas dealing with the strength of beams that can be thrown into this form can be easily compared. The factor *K* has a large number of values in reinforced concrete design, because sometimes we use a fiber stress of 500 lb. per square inch in the concrete and a fiber stress of 16,000 lb. per square inch in the steel. Sometimes the concrete may run as high as 700 lb. or as low as 300, while the steel may run from 10,000 lb. to as high as 20,000 per square inch. Why this is so and why it is right would take many pages to tell, but it is this that has prevented men heretofore from getting up tables of comparative values of the two materials—wood and reinforced concrete. In the upper part of a beam the stress is compressive and taken by the concrete. In the lower part the stress is tensile and taken by the steel.

When we select a factor $K = 120$ for concrete we assume that the concrete will be stressed 700 lb. per square inch at the top surface and that the steel will be stressed 16,000 lb. per square inch. In slabs less than 2 in. thick these values can be obtained by using a mortar composed of 2 parts of clean coarse sand, 3 parts of gravel or stone screenings not larger than a pea, and 1 part of cement. The cement must be a good brand of Portland, and one bag may be taken as a cubic foot. The sand and gravel, or stone, may be measured in carefully made boxes. The mortar should be mixed with plenty of water, so that it will be pasty and pretty sticky. It should never be wet enough to run, and it should never be as dry as the mortar used in some building blocks.

In slabs more than 2 in. thick use a concrete made of 1 part Portland cement, 2 parts clean coarse sand and 3 parts of gravel or stone ranging from pea size to pieces not more than ¾ in. cube. All workmanship should be first class. The steel should be most carefully laid and should be within ½ in. of the bottom of the slab. This ½-in. covering on the bottom does not add to the strength of the slab, but is there to protect the steel.

Moment of Resistance.

Now having a Moment of Resistance for wood represented by $200\,b\,d^2$ and a Moment of Resistance for reinforced concrete represented by $120\,b\,d^2$, it looks as if we could get close to a comparison by division, as follows: 200 ÷ 120 = 1.67, and thus find that d^2 of the concrete beam is equal to 1.67 d^2 of the wooden beam. Thus, for a wooden board ⅞ in. thick, first square the ⅞ in., which is most readily done by turning it into a decimal fraction 0.875. Squaring this gives 0.7656, which multiplied by 1.67 = 1.28, the d^2 of the concrete board. Extracting the square root of 1.28 gives 1.13 in. as the depth.

The "d" in wood is the full depth from top to bottom. In reinforced concrete it is always the distance from the top of the slab or beam to the center of the steel. As the slabs with which we are working are thin and the steel will be thin, ½ in. is enough to add in most cases, so that by adding ½ in. we get as the full thickness of the reinforced concrete slab 1.63 in. as against ⅞ in. of wood. The difference of 1.67 applies only to the squares of the depths and not to the depths, so the difference in thickness is less as the slabs get thicker.

The difference above given applies only to the depths when the breadths are equal. That is, for any particular width of beam or breadth of slab in wood or the same width or breadth in reinforced concrete the difference in the square of the depths will be as 1 : 1.67. This applies to boards, planks and beams and girders.

With this information in hand the experienced woodworker can substitute reinforced concrete for wood construction. He always knows, because of his experience, just what size timber he would use in a certain place, and can reason back from this knowledge to an exact understanding of what he will require in the way of thickness in a reinforced concrete slab.

The next thing to know is the amount of steel to use. The distance from the top of the concrete to the center of the steel being known as "d," the full thickness from top to bottom is known as "h," and this "h" never enters into any calculations, except those of cost, the "d" alone being used for calculations as to strength, &c. To get the area in square inches of the steel we must multiply as follows: Area of steel in square inches in width of beam or slab $= b \times d \times 0.0087$. When $b = 12$ in. then this becomes $A = 0.1044 \times d$.

Table for Boards and Planks.

The following table has been calculated for boards and planks from ½ to 3 in. thick to save figuring on the part of the man wanting the information and wanting it in a hurry:

	REINFORCED CONCRETE.		
WOOD. Thickness in inches.	*d.* Inches.	*h.* Inches.	Area of steel in 12 in. width. Square inches.
½ = 0.5	0.645	1.145	0.0675
⅝ = 0.625	0.807	1.307	0.0843
¾ = 0.75	0.968	1.468	0.101
⅞ = 0.875	1.13	1.63	0.118
1 = 1.00	1.29	1.79	0.135
1⅛ = 1.125	1.472	1.972	0.154
1¼ = 1.250	1.612	2.112	0.169
1⅜ = 1.375	1.775	2.275	0.185
1½ = 1.500	1.938	2.438	0.202
1⅝ = 1.625	2.100	2.600	0.219
1¾ = 1.750	2.260	2.760	0.236
1⅞ = 1.875	2.420	2.920	0.253
2 = 2.000	2.580	3.080	0.269
2⅛ = 2.125	2.780	3.180	0.290
2¼ = 2.250	2.905	3.405	0.304
2⅜ = 2.375	3.065	3.565	0.321
2½ = 2.500	3.225	3.725	0.336
2⅝ = 2.625	3.390	3.890	0.354
2¾ = 2.750	3.550	4.050	0.370
2⅞ = 2.875	3.710	4.210	0.387
3 = 3.000	3.870	4.370	0.405

For thorough protection of the steel it would be best to make "*h*" ¾ in. more than "*d*." In the table it is ½ in.

The kind of steel to use is important. When rods (round) or bars (square) are used they must be placed to run from support to support. They are to be carefully placed so they will be parallel, and the greatest distance between them should never exceed one and one-half times the thickness of the slab. This means for a slab having a "d" of 2 in. that the reinforcing rods or bars should be spaced not to exceed 3 in. apart. In addition to this there should be crossing steel to hold them in place, from 12 to 18 in. apart.

The greatest possible care should be taken to have the steel properly placed and tied with soft iron wire at all intersections. This is tedious work and often slighted. To this we owe the fact that there are so many accidents. For thin slabs the rods or bars will require to be very small indeed, and it is hard to get anything smaller that ¼ in. without using wire. In the slabs shown here we cannot use ¼-in. bars to the rule above given as to spacing. The cross sectional area of a ¼-in. bar is 0.25 sq. in., and it is only in the last slab that we can use them.

Owing to the fact that the slabs are thin and also that the men employed to do the work may be green and not do it properly, the man doing only an occasional job should use a ready made fabric of wire or expanded metal. When wire is used, however, the writer does not like to use a fiber stress so high, for the only hold the concrete has is its grip or adhesion to the smooth wire, and a heavy load might cause it to slip slightly. Expanded metal, in his opinion, is ideal for this work, because it consists of thin sheet steel in which staggered slits have been cut and afterward expanded into diamond shaped mesh. The hold in the concrete is perfect, and as the material is thin and flat it is always in the bottom. Be very careful in all work to have the steel down where it belongs. If it rises then "d" becomes smaller, and it is on "d," as we have seen, that the strength of the construction depends.

There are a number of firms in this country manufacturing wire mesh and expanded metal, and they have a number of combinations and can give any desired area per 12-in. width. To give areas not carried in stock means with the wire mesh manufacturers quite expensive operations in changing their looms, &c. With expanded metal, however, it is only a few minutes' work to change the cutting knives and alter the feed so that a customer can be given any areas for which he may call.

For joists, stringers and beams, the following will be of assistance. Knowing the "b" and "d" of the wooden beam, find M as follows: $M = 200\, b\, d^2$. Select some value for the "b" of the concrete beam and find "d" as follows: $d = \sqrt{\dfrac{M}{120 \times b}}$. If the "d" is too great for the work in hand, select a "d" and find "b" as follows:

$$b = \frac{M}{120 \times d^2}.$$

The area in square inches of the steel $= b \times d \times .0087$, and the steel should be in the form of rods or bars. Consult catalogues to see how they are placed. All reinforcing manufacturers give this information. Steel in beams should have not less than 1½ in. of concrete protection.

It is important to remember that concrete weighs about three times as much as wood per cubic foot.

Finishing Hardwood Floors in the Natural.

The extent to which hardwood floors are being used in dwelling houses and other buildings at the present day lends unusual interest to the methods of finishing them so as to give the most satisfactory results considering the purposes for which the rooms are to be used. A correspondent of that journal recently asking as to the best method for finishing oak, maple and other floors in the natural so that the wood will not darken, and if there is any way of bleaching hardwood floors that have been treated with linseed oil and become very dark with age, *The Painters' Magazine* suggested the following treatment:

Oak floors require a filler, if good smooth finish is desired in the natural, no matter what material is used. Maple does not require filling. For oak floors a good mineral paste filler and two light coats of grain alcohol shellac varnish, or in place of the latter, waxing frequently with a good floor wax will keep the floor from darkening. Ordinary floor varnishes or linseed oil will produce darkening. Mineral oils tend less to darkening of wood than linseed oil, but are not to be thought of for use in dwelling houses or public halls on floors, because of the tendency to soil the ladies' dresses. For maple floors three coats of grain alcohol white shellac varnish or repeated treatment with floor wax will not darken the wood.

As to the question about the bleaching of floors that have been oiled and become dark the only remedy we know of is to remove the oil with a paint and varnish remover and then treat the wood with a strong concentrated solution of oxalic acid or by the use of bleaching powder. The use of the last named, however, is liable to be injurious to the health of the operator, and we would not recommend its use. The oxalic acid solution, while poisonous, is harmless when used with care.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - TREASURER
GEO. W. COPE, - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

MARCH, 1909.

The Cellar as a Cold Air Box.

It is probably not far from the truth to say that if any one should suggest that he use his cellar as a cold air box, if his heating system contains indirect steam or hot water radiation, it would bring down the wrath of the self-appointed disciple of everything sanitary. This worthy asset of society would regard a move of this kind as a desecration of health laws, for he knows that the average Mr. Man, though occasionally clothed with smoking jacket and accompanied by his friend in briar, has no time for the subterranean chambers of his dwelling, and, having no intention of parading his friends there, allows it to become the storehouse of the heterogenous. When to nameless piles of accumulations are added layers of ash deposits, the relatively stagnant air of the cellar is not calculated to serve as a promising source of supply for circulation through the house. Nor is this view helped any by evidences of seepage through cellar walls or bottom or by periodic collections of moisture. In fact, a house situated on somewhat low ground, with foundation walls not proof against inleakage of water, is dangerous for any kind of occupancy. For then the hydrostatic pressure on the soil due to the fact that there is higher ground outside of the house tends to force water with whatever it may carry in solution into the cellar interior. It is on account of considerations of this kind that so many have opposed the use of underground ducts for carrying air in any kind of a heating system for the reason that the walls of the duct are more or less porous to water and gases in the soil, with the result that the air provided for ventilation is apt to be charged with constituents detrimental to the health. Nevertheless, where the site of the house is satisfactory in respect to the kind of soil on which it is placed and where there is absence of dampness, it would seem that the use of a cellar as a cold air box would be entirely feasible, a fact which makes it attractive for the advantages which such a cold air box will give. It simply provides that air can reach any and all of the warm air flues of the system without any difficulty, the indirect radiation being placed at the base of these flues and open on the under side to the air. Such an arrangement is now in existence in at least one dwelling with entire satisfaction. Such cellar windows as may be needed are of course kept open, so that there is a maximum diffusion and circulation of air within the cellar, which naturally is kept in an orderly condition, and besides being well illuminated by sunlight has its walls whitewashed, so that the chances for the growth of disintegrating or putrifying bacteria is a practical impossibility. In the installation in question the ashpit of the boiler is provided with a water spraying arrangement, so that before the ashes are removed the dust is allayed, and cannot be blown around in the actual removal of the ashes, and moreover, at the indirect radiators a filter of a sort of cheese cloth is employed, serving not only to prevent dust in the cellar from rising, but serving as a separator of any dust or débris which may be in suspension in the air received from out of doors.

Factory Ventilation in New York.

A factory ventilation law is on the statutes of New York State, and its enforcement is putting a slight suction on the pocketbooks of the owners of the buildings complying with it. While common decency if nothing more demands a proper distribution of fresh air in a shop where a large number are crowded together, the comparatively little lump sum outlay required to provide ventilating apparatus is seemingly meeting with opposition, notwithstanding accumulating evidence that proper ventilation pays a good return on the investment. There is more or less of a concerted movement on foot to modify the existing regulations covering the subject so as to render the requirements practically useless, and it is a duty on the part of the citizens of the State to see to it that their representatives in the Legislature are informed of the conditions and are asked to scrutinize any amendment or new bills, lest they contain some joker, if the intent is not obvious, whereby the existing law is nullified. When tests of the proportion of carbonic acid gas in the shop atmosphere show in some shops a ratio as high as 80 parts to 10,000 parts of the air, as tabulated in the report of the Commissioner of Labor of the State, there is no need of emphasis on the thin structure of the lung tissue, or on its great area of absorbing surface, or on the high speed of the blood circulation, all tending to subject the individual to unnecessary danger to sickness when compelled to remain in atmosphere of this degree of vitiation. It took no less than 10 years, in a work in which the American Society of Heating and Ventilating Engineers was closely identified, to bring about finally the passage in New York State of a law affecting ventilation of public school buildings, even with the moral support of the regulations already followed in the State of Massachusetts. It is only at a relatively recent date that the factory ventilation law of New York State became operative through the addition of a clause penalizing the owner of a shop where ventilation is not provided after a proper warning. The question is too important to allow a retrograde step, and nothing of the kind will be taken if the Legislators are given some idea of the voice of their constitutents. The matter is, moreover, a national one, and the efforts being made to secure compulsory ventilation even for school buildings in certain other States will doubtless experience a temporary setback or feel an adverse influence if the powers of the Labor Department of the State on the question of factory sanitation are limited. Instead it is quite important that some explicit measures be adopted so the factory inspector can determine more intelligently than at present possible the how to be done and what to be done in ventilation matters.

Matched Lumber for Metal Roofs.

Much has been said in the past about the desirability, if not the necessity, of having matched sheathing as a foundation on which to apply a metal roof, assuming, of course, that a roof of ultimate maximum economy is wanted. There is no necessity of reiterating at this time all these arguments. As a matter of fact, all, or nearly all, are conceded as axiomatic, the difficulty being that short sightedness prevails rather than long sightedness, first cost often warping the views of the consumer and contractor, so that the more invisible yet just as certain results of best work are overshadowed. As an additional plaint for matched boards, however, may be mentioned the experience of a considerable number during a recent summer, especially in certain parts of New York State. When different localities have been visited by hailstorms of record-breaking severity it was found that the tin roof withstood the battering without sign of failure where the roof boards were close together. Where such was not the case the metal was bent into the opening beneath the boards, with the result that there was a general breaking along the seams and the roofs were in some cases absolutely ruined. In comparison with most other roof coverings the tin roofs, notwithstanding, weathered the storms to their decided advantage so far as reputation for durability is concerned. Shingle roofs were perhaps among the worst sufferers.

Convention of Master Builders' Association of New Jersey.

The Master Builders' Association of New Jersey held its annual convention in Knights of Columbus Hall, Plainfield, N. J., on January 28, when 114 delegates were in attendance representing the associations of Atlantic City, Elizabeth, Englewood, Jersey City, Hackensack, Long Branch, Cranford, Montclair, Morristown, Newark, New Brunswick, Orange, Passaic, Paterson, Perth Amboy, Plainfield, Ridgewood, South Amboy, Summit, Westfield and Roselle Park. Interesting reports were read by President Dickinson and Secretary Pearson showing the association to be in a prosperous condition.

Officers for the ensuing year were elected as follows:

President, Andrew Dickinson, of Paterson.
County Vice-Presidents, Essex—B. F. Robinson.
Union—John Fredericks.
Middlesex—W. J. Huston.
Hudson—J. C. Lindsay.
Morris—L. C. Tompkins.
Monmouth—John H. White.
Passaic—W. T. Gutherson.
Bergen—J. H. Christopher.
Somerset—H. W. Hoffman.
Atlantic—G. M. Thompson.
Secretary, A. E. Pearson of West Orange.
Treasurer, A. J. Crowder of Newark.

Various resolutions were adopted and routine business transacted, after which M. V. Poole of Long Branch made an address on the subject of "Technical Education," following which there was a general discussion.

The Master Builders' Association of New Jersey at present has a membership of 1600, comprises 43 local associations in 10 counties, and has been in existence since May 20, 1903.

In the evening the delegates were tendered a banquet at Sængerbund Hall by the members of the local association.

The next convention will be held in April, the place to be determined later by the Time and Place Committee.

National Cement Users' Association.

The fifth annual convention of the National Cement Users' Association was held at the Hollenden Hotel, Cleveland, January 11-16. There were nearly 1000 delegates present and the convention was declared to be the most successful one held by the association. The sessions were largely devoted to the presentation of instructive papers on various subjects of particular interest to the cement men.

At the annual election of officers Richard L. Humphrey of Philadelphia was chosen president for the fifth time. The other officers elected were as follows: First vice-president, Merrill Watson of East Orange, N. J.; second vice-president, M. S. Daniels, Suffern, N. Y.; third vice-president, E. S. Larned, Boston; fourth vice-president, Geo. C. Walters; secretary, George C. Wright, Rochester, N. Y.; treasurer, H. C. Turner, New York.

STANDING COMMITTEE CHAIRMEN.

Arts and architecture, Leonard C. Wason, Boston.

Building laws and insurance, W. H. Ham, New York.

Roadway, sidewalks and floors, C. W. Boynton.

Machinery and appliances, L. V. Thayer, Minneapolis.

Concrete and reinforced concrete, A. E. Lindau, St. Louis.

Exterior treatment for concrete surface, Sanford E. Thompson, Newton Highlands, Mass.

Specifications for fireproofing, Rudolph P. Miller, New York.

An important feature of the convention was an exhibit in Central Armory of cement products, cement making machinery, &c. There were a large number of exhibitors and the exhibit attracted a great deal of interest.

The following awards were made for artistic and effective appearance of exhibits: First prize, Ideal Concrete Machinery Company, South Bend, Ind.; second prize, the George H. Rackle & Sons Company, Cleveland; third prize, American Hydraulic Stone Company, Denver; fourth prize, Hayden Automatic Block Machine Company, Columbus, Ohio.

New York State Association of Builders.

The annual convention of the New York State Association of Builders will be held on March 4 in the rooms of the Building Trades Employers' Association, 30-34 West Thirty-third street, New York City. A meeting of the Executive Committee to consider legislative matters will be held in the office of Counsel Ernest R. Eidlitz on the afternoon of Wednesday, March 3.

Slicing Party Walls Longitudinally.

A rather curious building operation has just been completed in the city of Paris in connection with a factory building growing out of the noise of machinery disturbing the occupants of the adjoining premises. The factory which was occupied by a power company did not have side walls of its own, but were shared with its neighbors to the right and left, thus making the three adjoining buildings practically one.

The walls were of heavy masonry, and in order to isolate the factory building from its neighbors a master quarryman who happened to be visiting the manager of the power house and accidentally heard of the complaints which were being made, proposed that the three structures be isolated one from the other by splitting the connecting walls from top to bottom. He proposed the use of an endless helicoid cord such as is commonly used in extensive stone sawing operations. The suggestion was adopted and has just been completed, leaving a perpendicular slit 2 in. wide and 70 ft. deep in each of the two walls separating the factory building from the adjoining structures, and tenants of the neighboring houses now say that they are not at all disturbed by the noise, and the vibration of the engines in the power house have completely disappeared.

THE TRADE UNION ATTITUDE toward the question of industrial education was discussed at one of the meetings of the National Society for the Promotion of Industrial Education. Luke Grant, the labor editor of the Chicago *Record-Herald*, said that the attitude of the wage earner at the present time is not clearly defined. Suspicion and distrust, he said, do not represent the real attitude even toward trade schools. He believed that the wage earner sees, probably more clearly than the employer, the human side of the problem.

CORRESPONDENCE.

Value of the Articles on Perspective Drawing.

From R. W. McDowell, Uniontown, Pa.—As I have sent nothing for the Correspondence columns for some time past I will take this opportunity of saying that I have not, by any means, forgotten *Carpentry and Building*. The articles on "Perspective Drawing," by George W. Kittredge, which were concluded in the early part of last year, have been most valuable to me. By studying them very carefully I have been able to pick up a very good knowledge and practice of perspective drawing, and these articles alone have been worth more to me than the money I have spent in subscription to the paper, to say nothing of the other information and interesting matter contained therein.

In binding my copies of *Carpentry and Building* for last year I noticed a letter in the Correspondence Department from "X. Y. Z.," Springfield, Ill., and would like to ask if he is the same "old chip" who used to write so frequently for the same department in 1880? If so he must come pretty near to holding the record for the length of time he has been a correspondent.

Note.—We are glad to state that the correspondent in question is the same one whose communications constituted such an interesting and valuable section of the Correspondence columns in the early volumes of *Carpentry and Building*. At last advices he was still hale and hearty and taking as deep an interest as ever in what appears in our columns, as evidenced by his quick perception of the ice box arrangement in connection with the competition last year in two-family houses.

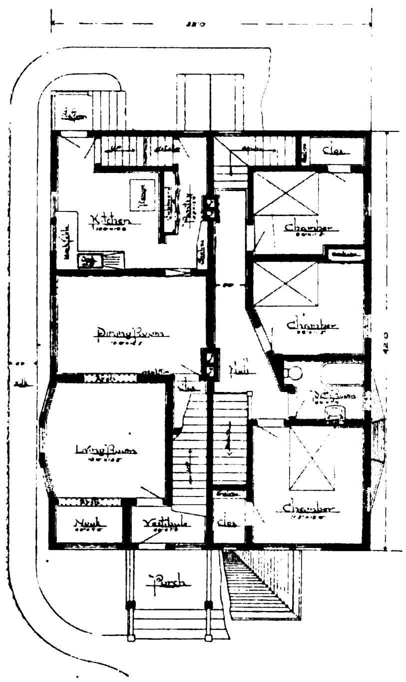


Fig. 1.—Half of First and Second Floor Plans Submitted by "F. D. C."

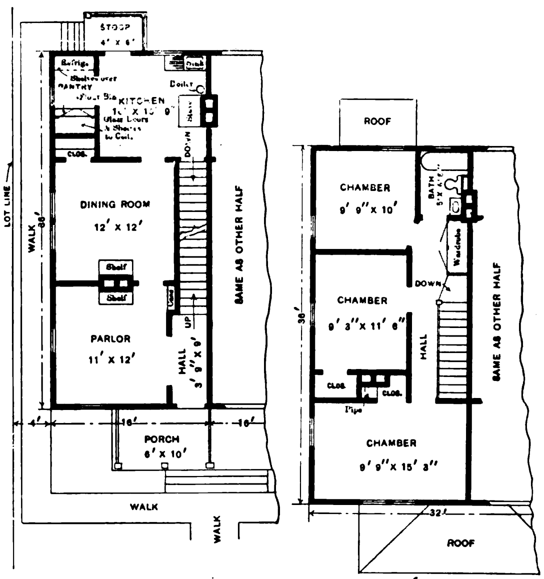


Fig. 2.—Half of First and Second Floor Plans Contributed by S. F. Tompkins.

Plans for Double House.—Scale 1-16 in. to the Foot.

Plans for Double House.

From F. D. C., Sturgeon Bay, Wis.—I am sending the floor plans, Fig. 1, for a double dwelling house, 32 x 42 ft., arranged along the lines asked for by "H. G. D.," Freeland, Pa., in one of last year's issues and think it may be built for the amount stipulated. The cellar could have a center wall to extend back to the rear of the kitchen chimney, and then so arranged that entrance could be had to both cellars from the rear outside cellar stairs. If "H. G. D." intends to use furnace heat the double flue in dining room could be enlarged by making the flues 8 x 16 in. each.

I have not made any elevation, as "H. G. D." says he can look after that in a way which he thinks will make the exterior attractive.

From S. F. Tompkins, Maywood, N. J.—In answer to "H. G. D.," Freeland, Pa., whose inquiry regarding a double house appeared in the November issue of the paper, I am sending under separate cover first and second floor plans for such a house, shown in Fig. 2, which I think will meet his requirements. As will be seen from the figures on the plans, the house is 6 ft. less in depth than the correspondent suggested. This, of course, will keep the cost down, and as the rooms are large enough for a house of its kind it seems unnecesary to make the building any larger. I have not submitted a cellar plan as that consists merely of foundation walls, chimneys and piers or posts for the support of girders. A 12-in. brick or stone wall should divide the two cellars, and holes should be cut through chimneys on first and second floors for stoves, unless a furnace be used in the cellar. Stationary washtubs could be placed in the cellar if desired or in the kitchen next to the sink. An outside cellar entrance could be made beneath the rear window of the kitchen, and stairs to the attic could be put in if wanted and the roof outlines would permit. The cupboard in the kitchen pantry is provided with glass doors and shelves to the ceiling, while underneath the countershelf, which is 3 ft. from the floor, is a flour bin and several drawers. There are shelves over the space indicated for the refrigerator. I have shown the arrangement of only one side of the party wall of the building, as the other is an exact duplicate.

I shall be very glad to give any further information that may be desired, and would suggest if the house is built from these plans that "H. G. D." tell us about it through the columns of this valuable paper, giving cost and other particulars likely to prove of interest.

Design for a Squirrel Cage.

From M. L. N., Dallas, Ore.—In the December number of *Carpentry and Building* "J. E. D.," Milton, Iowa, requested a design for a squirrel cage. I have seen a style of house or cage in use in public parks that is commendable, and I think especially adapted to the needs of the little pets of the correspondent's boy. I have attempted to sketch the design, Fig. 1, so it may be the better understood. Its location is preferably around the base of a tree in a sheltered spot near the house. If the tree is hollow for several feet up so much the better.

The cage should be built in the form of either an octagon or a hexagon, Fig. 2, and the sides should be of wire netting with a square mesh of about ¾ in., or as large as is possible without allowing the escape of the animals. This may be stapled to a light framework of 2 x 2 studs placed at the angles. At least two of the sides facing the prevailing storms should be boarded up in winter, or if desired the rear side made of boards and the remainder of netting. Temporary storm doors could then be fitted on any or all of the other sides, and whenever the weather permitted it would be but the work of a moment to remove them. Comfortable nests, with plenty of leaves, wool and other suitable materials should be provided near the top, as shown in the elevation, Fig. 2, where they will be warm and dry. The cage may be covered with any good prepared roofing, care being taken to make a good joint around the tree to keep the water from following it downward. It could be flashed with either tin or roofing, plenty of paint or cement being applied. In framing the rafters, allowance must be made for the growth of the tree. In case a tree is not available, a post or dead tree trunk reaching nearly to the apex of the roof will answer very well. It will be the part of wisdom to keep the door padlocked, as visiting youngsters are prone to leave it open. If the cage is made 5 or 6 ft. in diameter and 8 or 10 ft. in hight the squirrels will not have much need of an exercising wheel, though one may easily be constructed of netting on a side exposed to the sun. It could be made several feet in diameter or equal to the width of a side.

I believe this will be found far superior to the usual style of cage, while I am quite sure the pets will prefer it. If they must be housed, and I suppose they will be as long as there are small boys, let us surround them as nearly as possible with their natural conditions.

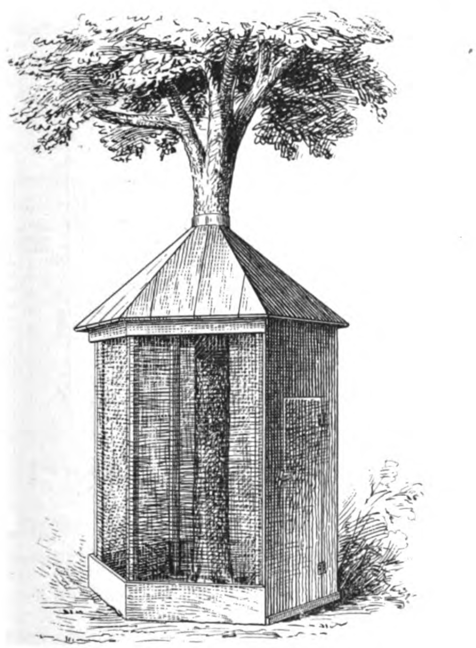


Fig. 1.—General View of Completed Cage.

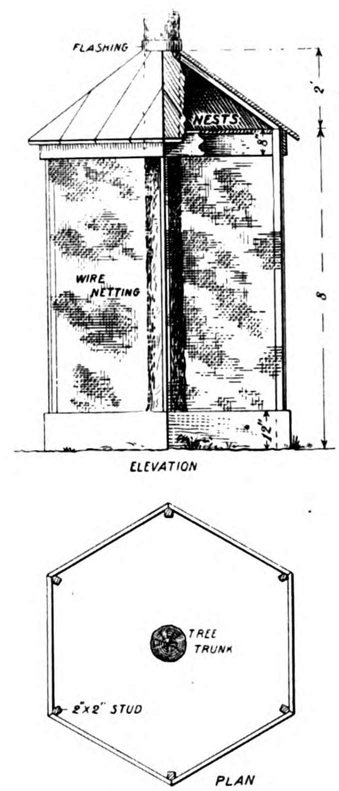


Fig. 2.—Plan and Elevation, Showing Construction.

Design for a Squirrel Cage.—Contributed by "M. L. N."

Pitch of Stair Treads.

From G. R. L., LaGrange, Ill.—I have long thought of submitting a question in stairbuilding to the readers of the Correspondence Department, and I now take the opportunity of so doing. What is the usual pitch to give the tread of stairs? I have read a great deal on stairbuilding and by inference at least assume the treads to be level. In actual practice, however, it is in my opinion always best to pitch the steps a little, especially if they are outside steps, in order to allow the water to run off, while inside stairs are easier swept if the treads pitch a little. The proportions I use are about 1-12 in. for inside steps and about 3-16 in. on outside ones. I was recently talking with an old stairbuilder who insisted that these proportions were not half enough. What says the craft? Possibly Morris Williams may have something to say on the subject.

Problem in Self-Supporting Roofs.

From J. C. W., Berlin, Pa.—I have a building from the center of one side of which extends an L or T which I desire to provide with a self-supporting roof, the idea being to have a clear ceiling in both the main building and the extension. I do not want the rafters of the main building to extend into the side addition, and I therefore come to the practical readers of the Correspondence Department to furnish drawings showing how this can be done. I have never seen anything like it published during the 20 years that *Carpentry and Building* has been coming to my address. A few years ago there was a most interesting series of articles by the late Frank E. Kidder, in connection with which were treated nearly all kinds of self-supporting roofs, but nothing which would cover just exactly the problem which I have outlined.

Finding Pitch of Stair Rail Across Well Hole.

From H. H. W., Houston, Texas.—As a sometime reader of *Carpentry and Building*, I should very much appreciate it if you would enlighten me in regard to a problem in stair railing. In "Commonsense Handrailing," by F. T. Hodgson, Fig. 1, on page 60, is a diagram for obtaining the face mold for a hand rail for a flight of stairs having a level landing, the landing and starting being in the springing line of the well and the radius of center line of rail being equal to half a tread. The bevel for squaring the wreath is simply the pitch of the stairs, one bevel only being needed, as the section at the lower end of the wreath is square with the plank. In Fig. 11, page 70, for an exactly similar stairs, the pitch board is placed some distance above riser 14, thus throwing the pitch across the well on the rake. Two bevels thus become necessary, and I take it that the pitch board being so placed makes the balusters over the upper flight longer than those over the first flight. I inclose a copy of the description accompanying this diagram in the hope that you may discover what is wrong. I think the pitch board, shown at P, should be brought down to the top of riser 14, thus bringing the rail across the well on the level, when only one bevel will be necessary. I hope to see a reply to this in the columns of your valuable paper.

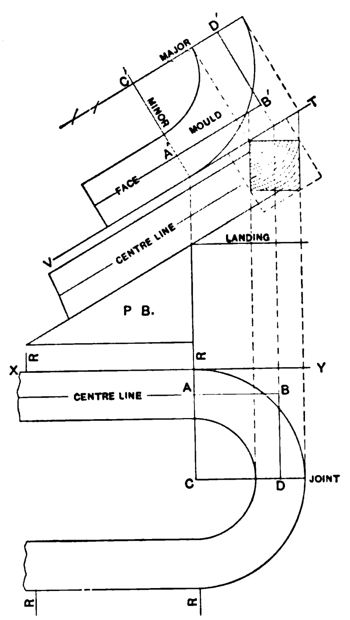


Fig. 1.—Reproduction of Fig. 1 on Page 60 of "Common-Sense Handrailing."

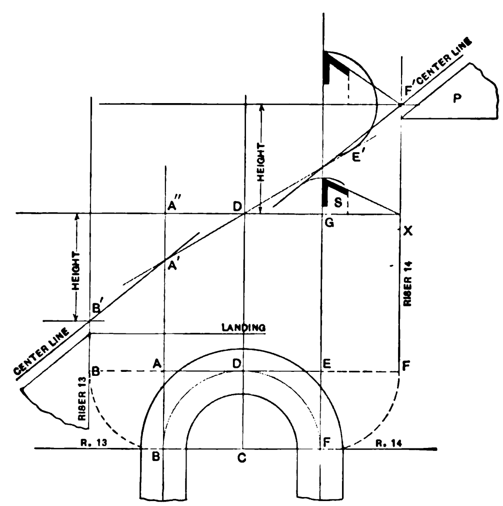


Fig. 2.—Reproduction of Fig. 11 on Page 70 of "Common-Sense Handrailing."

Finding Pitch of Stair Rail Across Well Hole.

Answer.—In Figs. 1 and 2 of the annexed diagrams we have re-engraved to a somewhat reduced scale the diagrams from "Commonsense Handrailing," referred to by our correspondent. Fig. 1 is so simple as to be self-explanatory, and this he naturally accepts as correct, the method shown being one which has been frequently illustrated in our columns. In reference to Fig. 2, however, we find that his criticism is well taken. In order to make this clear to our readers it will be necessary to quote a portion of the description referred to above. In doing so we shall call attention to what are evidently typographical errors, placing our comments in the foot notes. The description is as follows:

"To draw the development of the tangent lines, with A as center, turn A B around and with E as center turn E F around, erecting perpendiculars from B, A, D, E, F; then place the pitch board with the risers to the perpendicular springing line[1] at B and draw the underside of rail from where this[2] cuts the perpendicular. Draw the horizontal line (marked landing) where it cuts the perpendicular. From F set up the hight of a riser[3].

"Place the pitch board P as shown and draw the under side of the rail for the top portion. Set off half the depth of rail at top and bottom and draw the center lines. . . . Where they cut the perpendiculars from A and E draw the pitch across the well.

It would seem that after setting up the hight of riser 14 as described, the author must have intended to place the bottom of the pitch board at the point which we have marked X instead of below F, as shown at P. Had he done so he would have avoided the error which has puzzled our correspondent. There can be no doubt of the error, since if the top of riser 13 is, as shown, at a point below B, the top of riser 14 must be at the point X. With this correction, the wreath pieces might under certain conditions come to a level line at half the hight of a riser, as our correspondent has intimated. This, however, will depend upon the pitch of the straight part of the stairs. He should note that in the explanation of this diagram it is not stated that the width of the tread is equal to the diameter of the well. In fact, it is shown to be less. Since it is stated that the center lines must pass through the points B′ and F′, it is evident that if the angle of the pitch board were changed, their intersections, with the perpendiculars at A and E above referred to, would also be changed correspondingly, which would, of course, change the angle of the connecting line.

It is barely possible that the author had intended in this diagram to indicate another riser at D of the plan, which would then be No. 14, and that the entire error has been caused by marking the riser at F of the plan 14 instead of 15. Under this supposition only would the diagram and demonstration be correct in respect to rake and hights.

In the matter of the rake or pitch of that part of the rail going around the curve, it may be noted that the correct angle of the falling line of this part of the rail can be obtained only by constructing an elevation upon a base line equal in length to B D F of the plan, which, as

[1] This should read "riser perpendicular to the springing line."

[2] The oblique line of the pitch board.

[3] There seems to be an error in punctuation here. The period should be placed after the word "landing," when the following sentence would then read: "Where it cuts the perpendicular from F set up the hight of a riser." The position of the riser is clearly indicated in the diagram by the words "Riser 14," but the exact point of its hight has not been indicated in the original diagram. We have, however, added the point to the diagram and have marked it "X."—EDITOR *Carpentry and Building.*

will be seen, is less than the level line B A D E F and greater than A E. The line B A D F has been correctly obtained for the purpose for which it is intended, viz.: That of laying out the face mold, but the diagram does not show the correct inclination of the curved part of the rail. A method of obtaining the correct angle of the falling line of this part of the rail is shown in Fig. 3. In this diagram the length or stretchout of the center line of the rail shown by B D F of Fig. 2 is obtained by first constructing an equilateral triangle on the diameter of the well as a base. Thus, with A E of Fig. 3 as a radius and A and E as centers, describe two arcs intersecting each other at C, and from C draw lines through A and E, extending them to cut a line drawn tangent to the curve at D, as shown at A′ and E′. Then will A′ E′ be equal in length to the curved line A D E. This method of obtaining the stretchout of a semicircle is not exact to the last degree, but is sufficiently accurate for practical purposes. Any other convenient method of measuring the length of the curve may be employed. Now from A and E erect perpendiculars, and at any convenient hight draw the level line B G to represent the

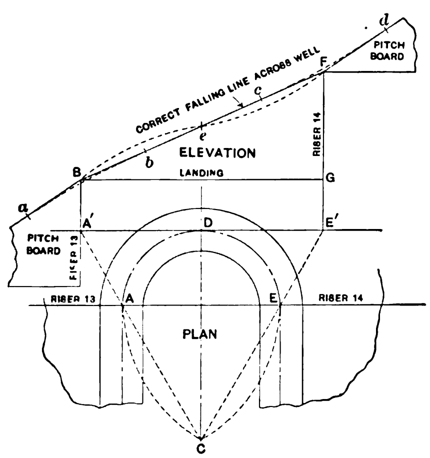


Fig. 3.—Method of Finding Correct Angle of Falling Line of Rail Across Well Hole.

Finding Pitch of Stair Rail Across Well Hole.

landing. At G erect a perpendicular equal to the hight of a riser, as shown by G F, and draw F B, then will F B show the correct pitch of the curved part of the rail. The pitch of the straight part of the stairs can be obtained from the pitch board, as shown above F and below B in the diagram, when the difference between the two angles will be seen and the necessary easements can be determined. One method of accomplishing the easement is by means of the dotted lines from *a* to *b* and *c* to *d*. A more graceful curve, however, is obtained in the line curving from B to F and passing through *e*. The radii of these curves can easily be found without further explanation. With the angle of the falling line correctly determined we presume our correspondent will have no difficulty in determining the bevels.

Opportunities of the Plasterers' Trade.

From "A Plasterer," New York City.—After reading the article on the above subject which appeared on page 17 of the January issue of the paper, I concluded I would give the readers my ideas on the matter. As I have followed the occupation for the past 15 years I cannot agree with what the writer of that article has to say regarding the opportunities offered in the plastering line, and therefore would be grateful for any advice that might be offered through the columns of the paper.

First, I have found it to be the most slavish trade in the building line, as we are all mated and matched against each other in a manner that causes competition of the keenest type and deprives the trade of any attraction that there ever might have been in it.

The less a plasterer displays his artistic tastes or his knowledge of material the more, in my opinion, a contractor or foreman will think of him.

The article in the January issue states that architects have difficulty in obtaining good men, and that a prominent architect is reported to have stated that modifications were constantly necessary in plaster specifications because of the inability to get the work done according to the design in anything like contract time, and that there would be more money spent for fine plaster jobs if the contractors could supply plenty of first-class men. My opinion is that the trade would have to be very busy before good plasterers were scarce, and instead of modifying the plans it would be better to put more men on the job and not run it with two or three favorites. At the same time, let the architect put an inspector on the job who will see to it that the work is correctly carried out according to his specifications. I may state that Greater New York has about 3000 plasterers on the books of the O. P. I. A. and about 50 per cent. of them are at present idle.

From G. W. T., Brooklyn, N. Y.—In reference to your extract from "Rock Products" under the heading "Opportunities of the Plasterers' Trade" in the January issue of *Carpentry and Building*, allow me space for a few comments based upon practical experience. I was surprised to read that architects and builders are having difficulty in securing first-class and competent plasterers. I venture to state for the benefit of the architects in question that there are plenty of men right here in Greater New York who would be glad to get the class of work they suggest—men of unquestionable ability either in interior or exterior work. The only thing the men complain of is the scarcity of such work, especially cement exteriors, including stucco, rough casting, pebble dashing, scraffitto, &c. Let the architects prescribe the work and the men will be forthcoming. I myself with many others are desirous of seeing more of this class of work in vogue in the near future, and shall be only too glad to help either personally or otherwise in assisting architects and others in securing such men as they need.

Articles on Stairbuilding.

From W. S. Wylie, Greeley, Colo.—I am much interested in the articles on stairbuilding by Morris Williams, and wish to follow them to their conclusion. I have drawn to a 1-in. scale his figures or diagrams giving the method of obtaining patterns of face mold, and by taking a block of wood, drawing the segment of a circle on the lower end with the tangent in place, then cutting it off on the pitch, I have been able to understand the reason for the different bevels and to see just how the pattern is laid on the plank and the rail taken out. It is an interesting method though not of much use in practice at the present day, as I have not seen a flight of stairs built with a cylinder and continuous rail in the last 20 years, and from the plans which are published I do not think they are built to any extent anywhere.

I have just completed my twenty-fifth year as a reader of *Carpentry and Building* without missing a single number and I still want it. The Correspondence Department is that which interests me the most, and I hope there will be more of the patrons of the paper who will contribute to this most valuable department.

Raising Heavy Martin Boxes on Poles.

From R. W. M., Uniontown, Pa.—I would like to ask some of the practical readers of the paper for a good method of raising heavy martin boxes on poles. This is somewhat out of the regular line of carpenter's work, but is more or less of a fad with me, and I have been providing houses for these birds around my home for some time. The last boxes I made are rather elaborate structures, weighing in the neighborhood of 200 lb. and containing 50 or more rooms. I want to get some method of hinging the poles, so that I may take the boxes down in the fall and store them inside over winter, and also want some windlass and tackle or other device which will enable me to raise and lower them easily. The poles are about 16 ft. long.

Determining the Width of Nosing for Stair Treads.

From J. C. B., Dowagiac, Mich.—There is just one point which I have failed to fully understand in connection with the articles on stair building by Morris Williams, namely, how the width of nosing additional to the width of tread is determined?

Answer.—Always make it correspond to the thickness of the tread. If the thickness of the tread is ⅞ in. make the projection of the tread beyond the face of the rise, which is the "nosing" equal to it.

If the thickness of tread is 2 in. make the projection of the tread beyond the face of the riser 2 in. This rule is generally followed by all experienced stair builders and is recommended by authorities on the art of stair building.

Gauge Attachment for Shingling Hatchet.

From L. K. L., San Francisco, Cal.—Very many improvements have been made in nearly all lines of the woodworking trade, though some few are to-day as they were many years back. Perhaps they are too small for any one to try to improve upon them. The manner in which shingles are laid on the roof is one of the things which has gone along for years without change. This seems to be a small matter, but if one stops to think of the many millions of shingles which are laid every year in the United States he will see that a little improvement on the present system may save the country many a dollar. Each section of the United States has its own way about many things which are not generally known or used outside of that certain city or section. Shingling, however, is done much the same all over the country; that is, two chalk lines are marked on the roof and two courses of shingles are laid out at one time. Then there is a lining up again and the operation repeated, much time being lost in this continual moving from one end of the roof to the other.

I am sending sketches relating to an improvement which will obviate this continual moving back and forth and reduces the cost of laying shingles 50 per cent. In Fig. 1 of my sketches is shown a section of the little attachment—we will call it a gauge—for the shingling hatchet. It is a piece of shaft steel ¾-in. in diameter and about ½-in. long. It has a slot cut in one side as wide as the blade of the hatchet is thick and a set screw is provided as shown. This gauge is fastened on the hatchet with the set screw as indicated in Figs. 2 and 3, the former representing a plan of a hatchet as it appears when looking down directly upon its top, while Fig. 3 represents a side view of the hatchet. The gauge is fastened 4½ in. from the face of the hatchet, or a distance equal to that which the shingles are laid to the weather.

In using the hatchet we first lay the double course at the eaves to a line in the usual way; then we are through with the line for that side of the roof and chalk is not used at all. Hold the gauge against the bottom of the course just laid and turn the face of the hatchet up toward the ridge of the roof; then lay the next shingle so it will rest on the face of the hatchet and thus continue. In this way one can lay as many courses in hight as he can reach before it is necessary to move further along on the scaffold, and when he meets his partner at the middle of the roof then he is ready to move up the scaffold or toeboard for the next courses. With this method one man can get along himself on a roof, as he does not require a partner to help him line up.

When chalk lines are used it is impossible to keep courses as straight as by the method just described, owing to the fact that the upper line is covered and it is necessary to guess just where it is.

In Fig. 4 of the sketches is represented the corner of a roof, *a* being the last shingle nailed on. Hold the corner *b* even with the shingle *a;* hold the gauge at *d* and tilt the shingle one way or the other until the corner *c* touches the face of the hatchet and then nail it. Continue in this way and you will have a perfectly straight line. If a shingle is badly out of square chop off the sides and true it up. When you meet your partner at the middle of the roof with as many courses as you can reach from one toeboard you can be sure the courses will all meet in a straight line.

This method is used in the city where I am at present. The gauges are made here by local machinists and can be obtained at a cost of 25 cents each. I have not seen them in any other cities or in any of the various tool catalogues. Therefore I am sure that there are comparatively few carpenters who know about this method of shingling roofs, but through the columns of *Carpentry and Building* the device will be brought to the attention of mechanics in every city in the country.

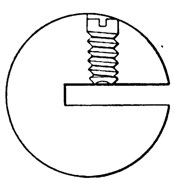


Fig. 1.—Section of Shingling Gauge.


Fig. 2.—Plan of Top of Hatchet.

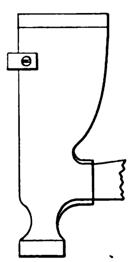


Fig. 3.—Side View of Hatchet with Gauge in Place.

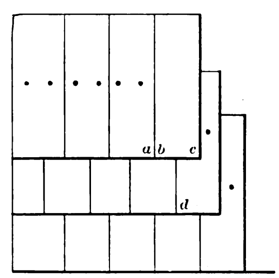


Fig. 4.—Corner of a Roof Showing How Shingles Are Laid.

Gauge Attachment for Shingling Hatchet.

Note.—It may be interesting to our correspondent, as well as to other readers, to state that in connection with some rapid methods of shingling described in the volume for 1906, reference was made to shingling hatchets with adjustable gauges designed to serve the same purpose as described by "L. K. L." We would especially call attention to the design described by "Western Builder" in the issue for February, and that by "C. J. B." in the issue for June of the volume stated.

Making Inside Sectional Blinds.

From R. H. C., Windsor, N. S.—Will some of the readers of *Carpentry and Building* kindly give me information through the correspondence columns regarding inside blinds made in four sections to each window? The trouble seems to be in the springs. The shutters will stay in place in summer, but when the heat is turned on in winter they are inclined to droop. The springs we have here are a bit of thin steel fastened to one side of the shutter. Perhaps some "brother chip" knows of a better spring or way of adjusting them. I would be thankful for any information on this subject.

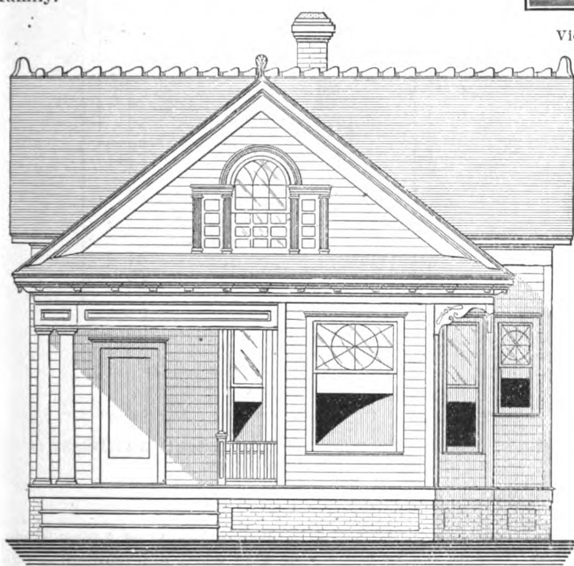
Design for Workingmen's Houses.

From R. F. F., El Dorado Springs, Mo.—In one of the issues for last year I noticed a request for designs of workingmen's houses suitable for erection upon a 33-ft. lot. The correspondent fails to state whether he wanted a cottage or a two-story house, and I am sending herewith blue prints of a 4-room cottage suitable for a small lot, which I trust will interest him. This house has a full basement under the entire area 7 ft. high, and a cement floor. The foundation is of rubble stone 16 in. thick to the grade line and brick for the balance, pilasters being dark red, while the panel brick are of light buff. The front and rear of the building is constructed with 10-ft. studs, while the two rooms in the middle are built with 12-ft. studs, thus making the break in the cornice.

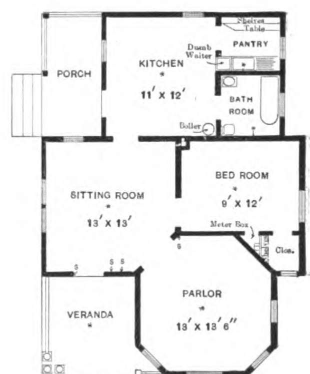
The parlor has an oak floor and oak finish; the sitting room an oak floor with cypress finish; the bedroom is finished in cypress, and the kitchen has a maple floor with pine finish.

The house can be built here from the plans I am sending for the sum of about $1000, while with a few changes it could be built for approximately $800. Stairs could be put in and a couple of good sized bedrooms finished in the attic if such were desirable and necessary. The photograph accompanying the drawings shows the appearance of the finished building. I would here state that I am at present living in one of these houses, and I find it very convenient and well arranged for a small family.

View of Finished House Reproduced from a Photograph.



Front Elevation.—Scale, ⅛ In. to the Foot.



Floor Plan.—Scale, 1-16 In. to the Foot.

Design for Workingmen's Houses.—Contributed by "R. F. F.," El Dorado, Mo.

I hardly think the correspondent, "W. A. W.," in a late issue, gives sufficient data as the basis for a person to draw much of a plan, but I will try to work out something for him in the near future.

Some Questions in Stairbuilding.

From G. H. G., Philadelphia, Pa.—I take this opportunity to thank the editor for the space devoted to the reply of Morris Williams to my inquiry regarding the lengths of treads of stairs which appears in the February number of the paper, and I also wish to ask something further in connection with the articles on stair building by the author in question. In the first paragraph of the fourth article in the January number a statement is made to the following effect:

> In this case it will be observed that we have the same pitch over the cylinder as over the straight flight, which is a condition due to the diameter of the cylinder, 10 in. being equal to the width of the 10-in. treads of the adjoining flights.

Can this be correct? According to the ground plan of the stairs shown in Fig. 19 of the third article where the dotted line *a* shows the face of stringer, this cannot be. The diameter of the cylinder must be less than 10 in. if it is 10 in. from the center of each rail. Am I correct, and if I am does the fact of the cylinder diameter being less than 10 in. alter the diagram Fig. 29? Should the diameter of the semicircle *a n b* in Fig. 23 be less than 10 in. as shown?

I should also like to know how Mr. Williams determines how many risers are contained in the plan curve of the wreath of any stair. In the third article (December issue) four are included beginning with the third riser; why is not the second riser included here as in the layout for the correspondent "P. P.," Akron, Ohio, in the January issue? Here even riser No. 1 is included, and apparently it is not any more in the curve than No. 1 and No. 2 in the plan, Fig. 19, which in that case are not included.

Answer.—The questions of our correspondent above were submitted to Morris Williams, author of the series of articles on stair building now running in these columns, and he furnishes the following comments in reply:

The cylinder considered in Fig. 29 in the January issue of the paper is that representing the cylindrical curve of the center line of the wreath rail. Its diameter is 10 in., which is equal to the width of treads of the adjoining flights.

This treatment will produce a uniform pitch for the rail over and above the cylinder with the flight rails as shown in the figure. If the diameter of the cylindrical curve of the center line of the wreath rail is less or more than the width of the treads such uniformity of pitch would not be produced, and the result would be a great deal of extra labor, combined with waste of time in the manipulation of the two sections of wreaths; in so much that the two tangents of each section would have two different pitches, and therefore two different bevels to give each section the required twist; whereas all such extra work as plainly shown in Fig. 29 is saved by merely arranging the diameter of the cylindrical center line of the wreath rail to equal the width of the treads adjoining.

In considering cylinders when used as in Fig. 29, to develop the tangents of wreath rails, it will be well for the correspondent and others interested to always remember that it represents the cylindrical curve of the center line of the rail, and not as "G. H. G." appears to think, the outside curve of the stringer. The latter example of a cylinder is shown in Fig. 23 in the issue for December last, and is used as there shown, not to develop the tangents of the wreath rail, but to find the stretchout of the outside face curve of the well hole stringer. The diameter of this cylinder depends on the thickness of the balusters used. If 2-in. balusters are used its diameter will be 2 in. less than the diameter of the cylinder used

I would also say to "Jack Plane," Portland, Ore., that if he would also get one of these rules it would save him the trouble of mutilating his rule with a punch, as it is marked for polygons and is in great favor by ship carpenters in making spars.

Work Bench Used in Making Window Frames.

From S. A. T., Boyne City, Mich.—For the benefit of "C. J. G.," Pittsfield, Mass., I am inclosing sketches, Figs. 1 and 2, indicating the details of a frame or clamp which, I trust, the correspondent will find satisfactory in building his window and door frames. The bench is one that I constructed and used for a number of years with very satisfactory results, and while the design is not all my own, embodying as it does some of the ideas of my employer, it is considered to be well adapted for the

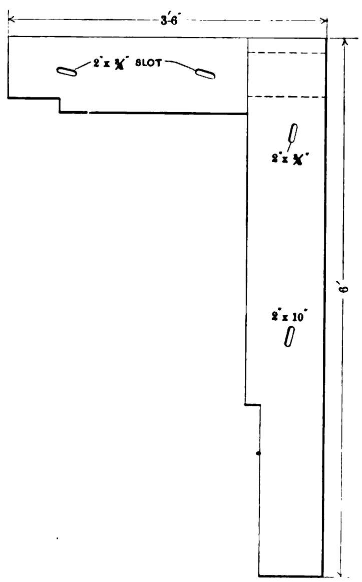


Fig. 1.—The Two Pieces of 2 x 8 In. Stock Mortised Together.

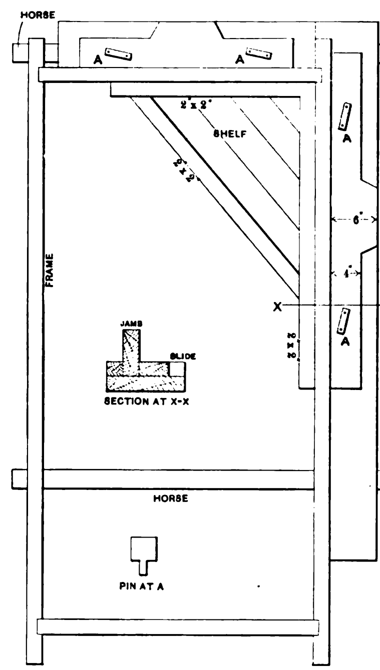


Fig. 2.—The Frame or Clamp Complete with Details of Construction.

Work Bench Used in Making Window Frames.

to develop the tangents of the center line of rail as presented in Fig. 29 of the January issue. The reason for this is that the center of the baluster, which is also the center of the rail, will be 1 in. on each side inwardly from the outside face of the stringer.

Regarding the number of risers to be used, as shown in Fig. 25 of the December issue, it may be stated that there is no arbitrary rule to govern the operation. An experienced stair builder knowing the nature of the construction would not use any rule, but would merely place his pitch board upon the plan tangent *d h* and draw the pitch of the rail, which would be parallel to the pitch line *c m* of Fig. 25, thus determining the pitch of the wreath over the plan tangent *d h*. The level line from *d* to the newel would then indicate the elevation of the level plan tangent *d* S.

The only purpose of the construction shown in Fig. 25 is to obtain the length and the pitch of the tangents, so that they may be used in the construction of the face mold shown in both Figs. 26 and 27 of the December issue.

An English Carpenter's Rule.

From C. J. M., St. Johns, Newfoundland.—I would say for the information of "R. E. C.," Jonesville, Mich., that the rule he wants is one manufactured by the Hockley-Abbey Works, Birmingham, England.

purpose, as it can be laid on a couple of horses when not in use or set to one side when not required. The great advantage is that it holds the frame solid and square while in use, and when the work is done a stay lath can be nailed on the outside of the frame, so that when the carpenter sets it the brace is not in the way.

In making the frame first take two pieces of 2 x 8 in. stock, one 6 ft. and one 3 ft. 6 in. long; mortise them together at the corner so they will form a perfect right angle, as shown in Fig. 1 of the sketches. Next make four holes about ¾ x 2 in. and place in them four pins made of some tough wood, after which nail a few boards diagonally across the corner to stiffen the frame, as shown in Fig. 2 of the sketches. Nail and glue on a piece of 2 x 2 in. stock to gauge the inside of the frame. The arrangement of the corner is then such as to afford a good place for the tools and nails, the 2 x 2 in. strip keeping them from sliding off. Make the sliding bars of some good tough hardwood 2 x 6 in., so they will stand plenty of pounding. The piece that sticks out is to hammer on. In order to tighten and loosen the window frame it would be a good plan to put in a few bolts. I always nail the first corner together before I place it in the clamp. This, I think, is the best plan as you can have the sliding bar long enough to hold the frame from being knocked out of square when the other corner is nailed. I also put on my blind stop and put in the strip on the bench.

The frame clamp on which I work will hold a frame from a 20 x 24 in. two-light up, and take in stock from ¾ up to 1¾ in. thick. I hope this description with the sketches will be of some use to the brother chip making the inquiry.

Cutting Hip Rafters for an Octagon Silo Roof.

From W. S. Wylie, Greeley, Colo.—There are several questions in the Correspondence Department in the December issue from "A. D. C." regarding the roof of silos. One of them relates to cutting the corner rafters on an octagon roof where the size of the silo is 14 ft. in diameter and the pitch of the roof is 9 x 12. My first thought was how to lay off the octagon. One rule is to take half the diagonal of the square and set it off from each corner, then connect the lines as indicated in the upper portion of Fig. 1 of the diagrams. If the diagonal of a square foot were exactly 17 in., then we could divide the side of the square into 24 parts and take seven parts set off each way from the corners and connect the points. This, however, would make the line from B to F about ½ in. shorter than from B to C.

Another way to set off three sides of an octagon from the arc cutting the seat of the common rafter extended to 10. Draw from 10 to 1 and we have the bevel at 10 for the upper end of the jack rafters or the upper end of the boards if put on up and down.

Set the compasses in 6, extend the other leg to 7 and set this distance out to 4 on the seat of the common rafter. Draw square to 5, cutting the seat of the hip. Again set the compasses in 4 and with the length of the common rafter cut the seat of the common rafter extended to 11. Connect 11 and 5 and at 5 we have the bevel across the edge of the boards if put on horizontally. The bevel at 1 is across the face of the boards put on horizontally.

If it should be desirable to measure the hip take 13 in. on the blade of the square and 9 in. on the tongue and then step off seven times, which gives the length and the bevels. The bevels at 1 and 10 may be obtained by the use of the steel square. Use the length of the common rafter on the blade and one-half the width of one side of the octagon on the tongue. The tongue gives the bevel at 1 and the blade the bevel at 10, or 15 in. on the blade and 5 in. on the tongue for this pitch. For the bevel at 5 use the length of the common rafter on the blade and the distance from 4 to 5 on the tongue, or 15 in. on the blade and 3¾ in. on the tongue. The tongue gives the bevel.

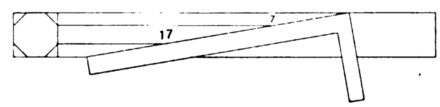


Fig. 3.—Marking a Square Timber to Work to an Octagon with Use of Steel Square.

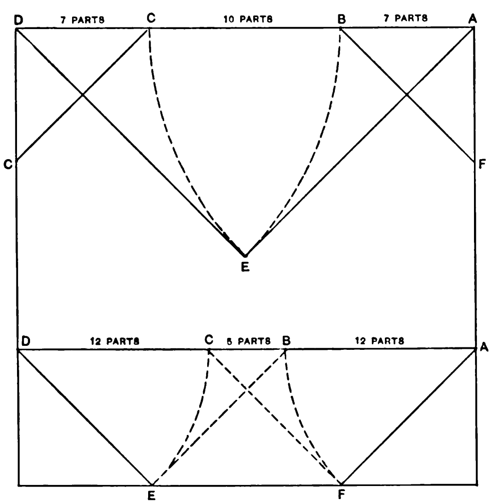


Fig. 1.—Laying Off the Octagon.

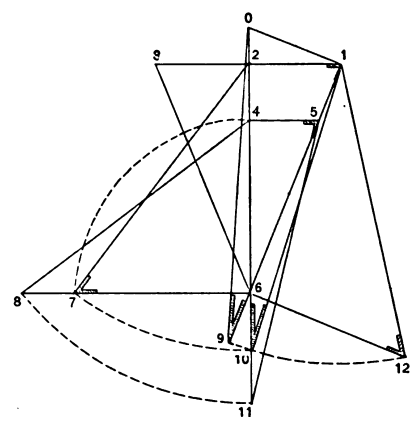


Fig. 2.—Diagram for Finding Lengths and Bevels.

Cutting Hip Rafters for an Octagon Silo Roof.

a straight line and which was published in *Carpentry and Building* over 20 years ago, is found in the lower part of the diagram, Fig. 1. Divide the line A D into 29 parts; take 12 parts for the extremes and five parts for the mean distance. Set one foot of the compass in A, extend to B and strike an arc to F; then with the same distance set one leg of the dividers in C and cross the arch at F. Proceed the same way with the other end of the line and we find the dotted straight lines as well as the sides of the octagon are all the same length.

In Fig. 2 the line 1 2 3 represents the 10 part space in Fig. 1, with the seats of the hip rafters drawn from 1 to 6 and from 3 to 6. From 2 to 6 is the seat of the common rafter. From 1 to 0 is a line drawn square from the seat of the hip to cut the seat of the common rafter extended. Now set up the rise of the roof from 6 to 12 square from the seat of the hip; connect 1 and 12 and we have the length of the hip with the down bevel for the upper end.

Set up the rise from 6 to 7 square with the seat of the common rafter; connect 2 and 7 and we have the length of the common rafter with the down bevel. Set the compasses in 1, extend the other leg to 12 and strike an arc, cutting the seat of the hip extended to 9. Connect 9 and 0 and we have the side bevel for the hip at 9. Set the compasses in 2, extend the other leg to 7 and strike

In Fig. 3 we have a method of laying the steel square on the side of a square stick of timber and marking the points to which to run gauge lines so as to work it to an octagon. The points used are 7 and 17 in. marks.

A Question in Brick Chimney Construction.

From C. G. L., Huntsville, Ala.—I have been a reader of *Carpentry and Building* for some time and have derived much good from it. I now come to the Correspondence columns for information in regard to a brick chimney which I have recently erected. I started the chimney 3½ bricks long by 2½ bricks wide. It is to be 32 ft. high, and is intended to take the smoke from one 6 in. and two 8 in. pipes. After the chimney was up 8 ft. owners of the building had me take it down and build it over again with a partition in the center so as to make two flues and the chimney 2 bricks wide and 4 long. The contention was that the first chimney would smoke when there was no fire in the basement, but with a fire started in the room on the first floor, and that the latter would not smoke. I wish those readers who have had experience in chimney construction would enlighten me on this point.

Two pipes are from boilers in the basement and one from a stove on the floor above. It is not intended to have a fire in all three at once all the time but only occasionally. Is it necessary to put a partition in a brick chimney where five or six stoves are to be connected to the one stack? If so, please give the reasons why.

Why the Fireplace Smokes.

From Ernest McCullough, Chicago, Ill.—Referring to the smoky fireplace mentioned on page 406 of the December issue, my experience in building a number of fireplaces leads me to offer a few suggestions. I inclose three sketches, of which Fig. 1 shows the fireplace as built. The draft, the correspondent says, is strong enough to take a newspaper up the flue, yet smoke blows into the room. The reason is that cold air comes down the chimney in such quantities that it falls behind the ascending hot air. The smoke being heavy does not travel with the hot air, and is cooled by the cold air in its descent and is forced in with the cold air that fills the vacuum caused by the air warmed in the room and drawn out by the flue. A more plentiful supply of air by means of doors and windows will help, but as the room is heated by the fireplace such ventilation will lower the temperature.

Fig. 2 shows a method I have used with success. The flue is continued down back of the fireplace and ends in a depression underneath where ashes and soot will collect and may be cleaned out daily. In the floor along the front edge should be openings which may be small holes or may be small registers. The warm air ascending will carry the smoke. The cold air descending will go underneath the fire and be slightly warmed. Then it will rise through the openings in front of the smoke. Here it will be warmed more and be forced into the room by the hot air reflected from the sloping back. It will consequently rise to the ceiling and float to distant parts of the room until cooled sufficiently to be drawn in its turn into the fireplace.

If too much cold air is admitted it will go at once up the chimney and the room will not be warmed. Therefore its admission must be capable of regulation. The registers should be near the ends of the fireplace to avoid eddies.

Fig. 3 shows how the present fireplace may be fixed. A plate, A, is fastened in the throat by a hinge on the lower edge. A rod with handle on the end should go through the wall and have catches so the draft can be regulated. The cold air will bank behind the plate and be warmed so it will not force the smoke down. When smoke comes into the room the damper can be opened or closed until the nuisance stops, and can then be left in position.

From L. M. B., Hood River, Ore.—In reply to "F. B.," Bolton Landing, N. Y., I inclose sketch, Fig. 4, showing construction which I use with satisfactory results. I have had a great deal of trouble with fireplaces in the past when I left the construction to masons without any instructions. A safe rule to follow is to have the number of square inches in the throat a little less than the number of square inches in the flue. For instance, for an 8 x 12 in. flue the throat should be 3 x 30 in., or 96 sq. in. for flue and 90 sq. in. for throat. This will cause smoke to curl about right and at the same time you will get the maximum amount of heat. Too much care cannot be taken in construction, and if a contractor will give an hour of his time watching the mason while turning the arch and throat it may save him an endless amount of trouble later. I also advise laying in firebrick as shown, clipping the face and bonding in to the back. Be careful to have a 2-in. curtain and avoid choking in the flue throughout. My mason leaves a square opening at the base of the flue above the fireplace. By placing a board in the flue he catches all dropped mortar. When topped out remove the board and close the opening. This assures a clean throat.

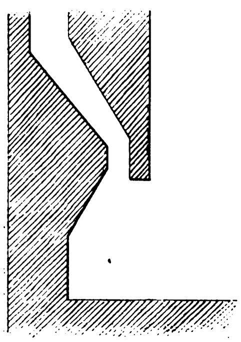


Fig. 1.—Fireplace as Built.

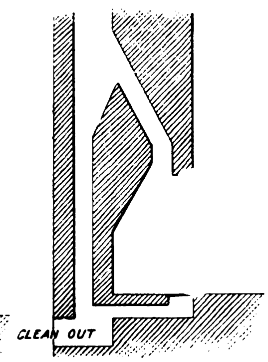


Fig. 2.—Satisfactory Method of Construction.

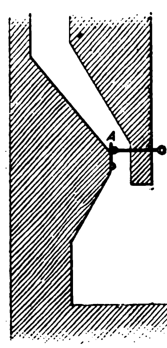


Fig. 3.—Showing How Mr. McCullough Would Overcome the Correspondent's Difficulty.

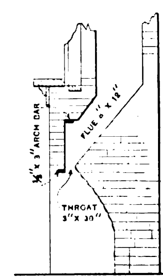


Fig. 4.—Plan Suggested by "L. M. B."

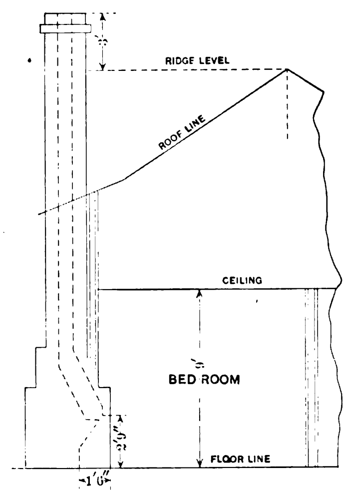


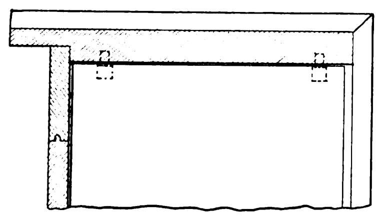
Fig. 5.—Sketch Submitted by H. H. Warfel.

Why the Fireplace Smokes.—Remedies Suggested by Various Correspondents.

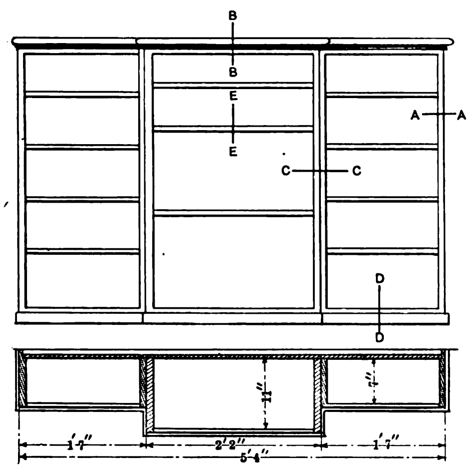
From H. H. Warfel, Conesville, Ohio.—In regard to the inquiry of the correspondent in the December issue as to why his fireplace smokes, I would say that if he will take out the grate and reset it, bringing the back wall up as indicated in the sketch, Fig. 5, which I inclose, so as to leave a 2½ or 3 in. throat, and then raise the chimney about 3 ft. higher than the top of the ridge, it will overcome the smoke nuisance. In my opinion, the size of the flue is all right, as I have built chimneys with 8 x 9 in. flues with 2½ or 3 in. throat that work with entire satisfaction. I should like very much indeed to have the correspondent tell us through the columns of the paper what plan he finally adopts to overcome the trouble and with what success. Pitch in, "brother chips," and help the Editor to add still more pages to the volume for 1909.

Details of a Convenient Bookcase.

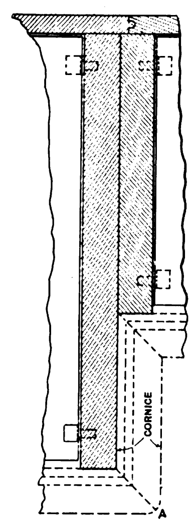
From Arthur W. Joslin, Boston, Mass.—I am sending for the benefit of the readers who may be interested blue prints of a bookcase I recently designed and had built for my own use. It is constructed of plain oak stained dark, similar to the mission style of furniture, and finished in three coats of shellac rubbed to a dead finish. There are no doors to the case, as I have found that doors are a nuisance and make it look as though the books were on exhibition rather than for constant use. The case stands 3 ft. 7½ in. in hight and is 5 ft. 4 in. in width. It will be observed from the drawings that the central section is somewhat deeper than at the sides, this being intended to hold large books. All the shelves are adjustable, so that each section can be arranged separately to suit the requirements of the case. In the central section this permits of putting shelves in a portion of the spaces 4 in. or 5 in. apart for filing magazines until such time as they are bound or otherwise taken care of. The drawings speak so clearly for themselves that further comment would seem to be unnecessary.



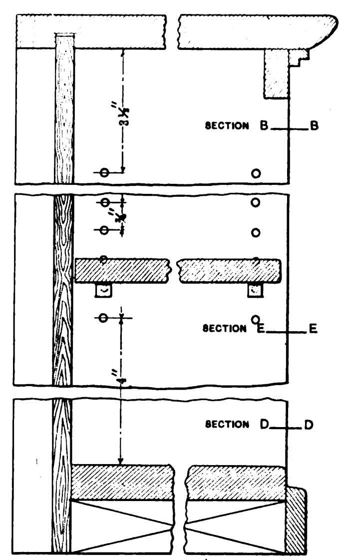
Section on Line A-A of the Elevation.



Plan and Elevation of Bookcase.



Section on Line C-C.



Vertical Section of Bookcase on Lines Indicated.

Details of a Convenient Bookcase.

The Jobbing Carpenter.

From L. E., Massachusetts.—I have been much interested in the article on "Jobbing Carpentry," which appeared in the January issue of the paper, and have noted the invitation to ask the author questions about that class of work. I would say that I am considering the matter of following the occupation of jobbing carpenter, although I am not a carpenter by trade, being deaf, but have the qualities of being a handy man at repairing, &c. I would like to ask if the trade unions interfere with persons doing such jobbing unless one joins them before he is certain whether or not he wishes to "stay in." Will the author of the article in question give a general idea of the best methods of determining charges where the workman furnishes the material as well. I am sure that further contributions to the subject will help many good but inexperienced workmen to begin right.

Note.—The above communication was submitted to Mr. Crussell, the author of the serial article on "The Jobbing Carpenter and Some of His Work," and he furnishes the following comments in reply:

Before attempting any reply to the questions put forth by the correspondent above, I wish to make a few comments on the opening paragraphs of his letter. Far be it from me to place a stumbling block in the way of any man endeavoring to earn an honest livelihood, but I feel that I must point out to him that if he is considering the question of following the occupation of "jobbing carpenter" in competition with experienced mechanics he is almost certain to meet defeat.

Jobbing carpenter, whatever the name may seem to imply, does not mean merely a handy man—not by a whole lot. To use a homely phrase in jobbing work, "every tub must stand upon its own bottom." It is not profitable for the "Boss" to attend personally to small jobs on which his profit may be only a dollar or two; he must employ a man of skill upon whom he can depend, and as a large percentage of jobbing work has no precedent this man must be able to take the initiative and figure ways and means for himself. It goes without saying that he must be a competent mechanic and able to finish his work in a satisfactory and workmanlike manner, so that he may be able to retain the customers and bring more work to the shop. This being so it will be found that the men who do the jobbing work are generally the oldest and best mechanics in the shop; men who are noted for their ability to do all classes of carpentry work well rather than men who are noted for their ability to do only one class quickly. The above practically answers the correspondent's questions.

Regarding trade unions, it is very difficult for a man to say what a union will or will not do, but this much is certain: If the correspondent hires out to a contractor as a carpenter—jobbing or otherwise—the other men will probably refuse to work with him, and in the next place the "Boss" will refuse to pay him union wages, which he must do if it is a union shop. The last paragraph of the correspondent's letter, however, gives the idea that he intends to work by himself and be his own contractor. In this case he probably need not fear anything from the unions, unless he comes into conjunction with men of other trades. For instance, suppose an owner is having alterations made to the plumbing of his house and hires "L. E." to cut the holes and do the necessary woodwork, the plumber being a union man would be likely to refuse to work with any one but a union carpenter.

As regards the making of estimates for jobbing work, I am afraid it is beyond my power to set down any rules that would be of much practical use. As a general thing there is very little competition in jobbing work, and a large proportion of it is done by the day, the contractor charging enough above regular wages for the man's time to constitute his profit and enough above the regular price of material to pay for handling and storage. Items of cartage and sometimes carface also appear on the bill.

Estimates, even on straight work, vary so much that 10 men will turn in 10 different estimates for the same job, the highest estimate often being twice the amount of the lowest. I remember once doing a job for $15 that had been estimated at $50, and another time I did a job that cost in actual money for time and material $58, that was estimated at $30. This latter job had a circular headed window with molded casings that cost $15 at the mill and was glazed with plate glass that cost $7 more. There was also a four panel door and other lumber. As it happened, the job was one of day's work, the estimate being merely given verbally to me as an indication of how long it ought to take to do it. Estimating for jobbing work is like estimating the weight of live cattle—a good guesser will beat the best calculator time and again.

In conclusion I would draw the attention of "L. E." to the very able articles on estimating, especially those on "Estimating the Cost of Building Alterations," contributed to the 1908 volume of *Carpentry and Building* by Arthur W. Joslin. These articles cover the ground of estimating very fully, and there is one relating to the addition of another floor to a store building involving some very interesting problems, presented on page 241 of the July number for last year, which I specially commend to the attention of "L. E." I will try whenever possible in forthcoming articles to give some idea of how long I think that particular job should take, but these ideas cannot be used as estimates. The contractor must be guided very much on such small jobs by the capabilities of his men and his own experience.

Roofing a Silo.

From G. A. W., West Lebanon, N. H.—I have noticed that "A. D. C.," Johnsonville, wants a plan of roof for a 14-ft. round silo. In reply I would say that I built octagon roofs on three the past summer, and am inclosing a rough sketch of the roof plan (Fig. 1). I used 2 x 6 for the plate and 2 x 4 for the rafters, with an octagon part in the center covered with boards and asbestos roofing. I left a space between two of the rafters for a door, with hinges at the top, as shown by the cross timber.

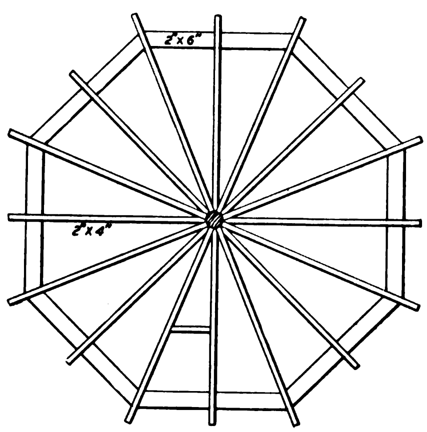


Fig. 1.—Plan of Roof for Silo Submitted by "G. A. W."

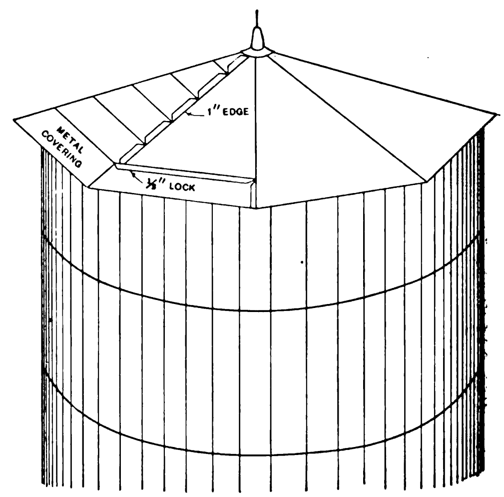


Fig. 2.—Elevation of Upper Part of Silo Accompanying Letter of "B. M."

Roofing a Silo.

From B. M., Augusta, Ky.—Replying to the inquiry of "A. D. C." in the December issue, would say that in my experience it does not pay to use a home-made cement. It is better to buy a proper cement from some reliable manufacturer.

In answer to his request for a drawing and plain instructions for roofing silos, both round and octagon, would say that both should be covered in exactly the same way, which is made clear by Fig. 2 of the drawings. If slate is used for the covering any one size can be used to complete the job. If galvanized iron or tin is used the work should proceed as indicated by the sketch, commencing at the bottom or eave, laying each section through to the top, allowing 1 in. projection of metal on each section for standing double seam. The extreme top can be best finished with a cap or finial.

Various Stains for Oak.

From S. D. H., Spokane, Wash.—I would like to ask through the Correspondence Department the best method of procuring the ingredients and the way to fumigate oak; also how to construct a room large enough to accommodate three or four Morris chairs at one time.

I would like the recipe for making oil stains of old English, weathered and Flemish oak, also recipe for fumigating.

Back Volumes of Carpentry and Building Wanted.

From H. H. Wheeler, Plymouth, Conn.—I have lost all of my numbers of *Carpentry and Building* for 1901 and 1902, and I come once more to the Correspondence Department to ascertain if there are any readers of the paper having the volumes for these years who can be induced to part with them. If there are any such I shall be pleased to hear from them, either direct or through the Correspondence Department.

Cement Block vs. Brick Construction for Chimneys.

From L. E. T., California.—Will some of the readers who have had practical experience in this line tell me whether or not a chimney built of cement blocks is as good as one constructed of brick?

WHAT BUILDERS ARE DOING.

A COMPARISON of the available figures covering building operations in the leading cities of the country with those of the initial month of last year shows the industry to be rapidly assuming a more normal condition. The gains both in the number of permits issued and the estimated cost of the contemplated improvements in many sections are unprecedented, but are readily explained upon the ground that in January last year building operations were restricted to an alarming extent. Increased operations in the building line usually foreshadow more work in all those branches of trade which draw their inspiration and activity from this important industry, and the situation as reported from practically every part of the country promises well for the spring, while bespeaking for thousands of present idle workmen an active engagement. Thus far there are no indications of serious labor disturbances, and with an absence of friction there would seem to be no reason why building operations should not be conducted upon a scale which will make the volume of business for 1909 compare most favorably with periods of normal activity.

Atlanta, Ga.

The new year has started off more briskly as regards the amount of new building work projected than any other year in the history of Atlanta. Unlike January, 1908, when the permits were among the smallest since the law creating the office of Building Inspector was passed, January, 1909, has been a record breaker. Architects, builders, real estate men and others interested in building matters point out that the great gain which has occurred is one of the most remarkable instances of the city's growth developed in years.

The value of the permits issued last month was $557,243, which is greater than the combined total for the months of January and February last year. Among the permits was one for a $200,000 theater and office building to be erected by the Realty Trust Company. This was the only large permit of the month, the others being for dwellings, one or two apartment houses, alterations, repairs, &c. It is estimated that at the present time over $2,000,000 worth of buildings are being erected in the city. Some are nearing completion, while others have just been commenced. Dwelling houses with a combined valuation of more than half a million dollars are under way, as is also the new post office, which will cost $1,000,000.

Buffalo, N. Y.

The growing feeling of confidence in the future is reflected in a way, at least, in the increased activity in building projects which were recorded last month. The actual number of permits issued was not such a striking feature as the increase in the amount of capital involved as compared with January a year ago. The figures of the Building Commissioner's office show 178 permits to have been issued for building improvements estimated to cost $553,000, whereas in January a year ago 127 permits were taken out for improvements costing $243,000.

The Builders' Association Exchange held its annual election at its headquarters in the Builders' Exchange Building, Pearl and Court streets, on Friday, January 15, the polls being open from 11 a.m. until 2 p.m. The result of the balloting showed the following officials to have been elected for the ensuing year:

President...............Frank N. Farrar.
Vice-President...........William B. Ogram.
Treasurer...............Frank C. Kempf.
Secretary...............James M. Carter.

Trustees were elected for three years as follows: M. G. Farmer, C. B. Jameson and George Schaaf.

Members of the Arbitration Committee were elected as follows: John W. Henrich, Christian Flierl and Theodore Metz.

Cleveland, Ohio.

The building outlook in Cleveland shows much improvement as compared with a year ago. During January 356 permits were issued in the city Building Inspector's office for structures to cost $458,945, as compared with 308 permits issued during January, 1908, for buildings to cost $291,771. Considerable construction work is now going on for this season of the year, and contractors are figuring on a fair volume of work to be started as soon as spring opens. Among the new work projected are several good sized business blocks and office buildings. Bids will be received this month for the 12-story Brotherhood of Locomotive Engineers' Building, which will cost about $1,000,000.

Clinton, Mass.

A meeting of the Master Builders' Association was held on the evening of January 13, when officers were elected for the ensuing year, as follows:

President...............William M. Lee.
Vice-President...........Andrew J. Robinson.
Secretary...............J. H. Wilder.
Financial Secretary......George A. Barnard.
Treasurer...............George C. Hudson.

At the close of the business meeting a supper was served, after which the members participated in a discussion of business conditions.

Dallas, Texas.

The members of the Builders' Exchange held their annual meeting on January 11, when officers were elected for the ensuing year. The balloting resulted in the choice of:

President...............L. R. Wright.
Vice-President...........J. M. Hansen.
Secretary...............H. J. Emmins.
Treasurer...............L. Jackson.
Sergeant-at-Arms........J. A. Hyatt.

After the election the new officers were duly installed, the ceremonies being conducted by State President McCord. A resolution of thanks was extended to the retiring officers for the faithful and loyal manner in which they had discharged the duties of their respective offices, after which the meeting adjourned.

Detroit, Mich.

Building operations in January made a splendid showing, the percentage of increase over January, 1908, being larger than was the case for many years. Figures prepared in the Fire Marshal's office show permits were taken out last month for 167 new buildings, valued at $650,800, and for 27 additions, at $147,350, making a total of $798,150. In January, 1908, permits were taken out for 163 new buildings, valued at $302,950, and for 29 additions, at $23,800, making a total of $326,750. It is somewhat peculiar that while the number of new buildings and additions noted are practically the same, the actual value is more than double that of January, 1908.

Permits for the first week in February show a total of $119,550, all of them for small residences. A considerable number of big buildings are planned, and it is expected that the February record will be well in advance of the same month in 1908.

Officers for the coming year were elected February 9 by the Builders' Association of Detroit, as follows:

President...............John H. Laurie.
First Vice-President.....Earnest McCleary.
Second Vice-President....Thomas E. Beck.
Secretary...............James Roach.
Treasurer...............Walter S. Russel.
Commissioner...........John J. Whirl.

The Board of Directors for 1909 comprises Richard Helson, Robert Teakle, Charles L. Batchelder, John E. Smith, G. Jay Vinton, A. A. Albrecht, John H. Laurie, A. C. Goodall, Thomas E. Beck, John Christie, Frank J. Miner, Earnest McCleary, James Roach, August Hess, Otto Wurn, Frank A. Hesse, William Voigt, Jr., James T. Whitehead and W. S. Russel.

In his annual address President Laurie said that undoubtedly the most important occurrence, from an associational point of view, was the formation of the Michigan State Association of Builders, and he urged all the members of the Detroit association to attend the first annual State Association meeting in Grand Rapids, February 18.

At a meeting of the Board of Directors of the Builders' and Traders' Exchange, held on February 5 and following the annual meeting held the previous day, the board organized by electing the following officers:

President...............Charles L. Batchelder.
Vice-President...........George F. Stokes.
Secretary...............Thomas M. McEnhill.
Assistant Secretary......George Wallace.
Treasurer...............John L. Austin.

Denver, Colo.

From present indications this promises to be the greatest year in the building line that Denver has ever known. It may seem a little early to make such a radical prediction, but the extent to which permits for building improvements are being filed in the Department of Buildings tends to confirm this view. According to Inspector Robert Willison there were 234 permits issued by his department in January for building improvements estimated to cost $694,475, these figures comparing with 175 permits for improvements costing $294,750 in January last year.

The bulk of the permits issued in January of this year was for brick residences, of which 132 were projected, estimated to cost $338,800. Next in order were 10 business buildings to cost $100,000, two warehouses to cost $33,000, five apartment buildings to cost $56,000, seven terraces to cost $47,000, and additions, alterations and repairs involving an outlay of $78,000.

Galveston, Texas.

The members of the Builders' Exchange held a very interesting meeting on the afternoon of Friday, January 15, when reports of retiring officers were presented showing the exchange to be in a most flourishing condition. The Board of Directors elected consists of Frank Jones, Fred Hartel, C. G. Wolfer, William Jansen, Robert Pallizer, M. C. Bowden, George P. Warner, William Tootil, Edward F. Drewa, R. C. Malitz, John Peterson, William Rowley, John Egert.

The directors held a meeting and organized by electing the following officers:

President...............Fred Hartel.
Vice-President...........R. C. Malitz.
Secretary...............Edward F. Drewa.
Treasurer...............F. Jones.
Sergeant-at-Arms........John Peterson.

The members of the exchange decided to have a permanent Entertainment Committee and selected for the purpose William Tootil, W. J. Schmidt and R. Kinze. The meeting was an enthusiastic one, and the members of the exchange are much encouraged over the outlook for the coming year in all branches of the building industry.

Louisville, Ky.

The annual meeting of the Builders' Exchange, which occurred on the evening of January 29, was one of the most important gatherings, so far as results accomplished were concerned, that has been held for a long time past. The principal subject of discussion was a resolution, which was finally adopted, calling for the unification of the seven existing organizations of the city connected with the building industry. These are the Association of Master Builders, the Master Plumbers' Association, the Builders' Exchange, the Master Brick Contractors' Association, the Electrical Contractors' and Dealers' Association, the Master Sheet Metal Workers' Association and the Contracting Plasterers' Association. At the meeting a committee of eight on organization was appointed, to report at a later date.

It is understood that the proposed organization will in no way interfere with any of the present builders' associations, but on the contrary it is hoped to bring them into closer and more harmonious relations.

At the meeting Secretary E. A. Quarles presented his annual report, which contained much valuable information relative to the exchange and the building situation. Reference was made to the meetings held by various committees and directors during the year, the attendance at exchange headquarters and the heavy falling off in building operations in the city during 1908. With regard to the current year, he intimated that the signs pointed strongly to an active season. One of the interesting features of the year was the publication in May, for the first time, of a "Builders' Exchange Year Book," containing in alphabetical and classified form the names of the members of the organization, together with their addresses and telephone numbers.

A new feature of considerable benefit to members is the issuance of construction bulletins, giving definite advance information regarding building work that is contemplated. The secretary pointed out that the biggest immediate problem facing the exchange is the matter of attendance at the 'change hour, 11.30 to 12.30. It was suggested that all meetings held at the exchange should, if possible, be fixed for this hour. The secretary also referred to the co-operation of the Builders' Exchange with Building Inspector Morris and the Louisville chapter of the American Institute of Architects in perfecting the present building ordinance. In conclusion, the secretary stated: "It is comforting to face 1909 with the knowledge that it is sure to be a big improvement over 1908, and with the probability that it will compare favorably with the better years of recent times."

At a meeting of the new Board of Directors, held February 5, the following officials were selected for the ensuing year:

President...............E. G. Heartick.
Vice-President...........W. C. Magruder.
Second Vice-President....W. B. Pell.
Treasurer...............Alfred Struck.
Secretary...............E. A. Quarles.

There was a large increase in building permits issued in January as compared with the same month a year ago, which, while gratifying, is not at all surprising considering that the period a year ago was in the midst of extreme business depression. Last month 121 permits were issued for improvements estimated to cost $132,830, the largest permit being for an addition to the Presbyterian Seminary, to cost $25,000. In January a year ago there were 135 permits taken out for buildings estimated to cost only $71,961.

Los Angeles, Cal.

Building operations in Los Angeles were not interfered with by the weather to so great an extent as in the other cities of the coast, but there were a large percentage of the working days of January when men engaged in outside work were obliged to stop operations. The building permits issued during the month included 483 structures of all sorts, to cost a total of $646,007. This is somewhat above the record for the same month in 1908, when 467 permits were issued for buildings to cost $469,104, but is slightly below the record for December, when the number of permits was 581 and the total cost $667,629. The brick construction here in January amounted to only $216,574, while the frame construction amounted to $430,000. Of the latter, more than one-half was for one-story frame residences, and practically all of the rest was for two and one and one-half story residences. The brick construction consisted of 17 business buildings of class C type, ranging in hight from one to four stories.

Builders do not anticipate any great activity during the present year, but the general idea is that the improvement so far noted over the year preceding will be maintained from month to month.

Milwaukee, Wis.

At the annual meeting of the Builders' and Traders' Exchange, held on the evening of Tuesday, January 12, officers for the ensuing year were elected as follows:

President...............H. C. Fuldner.
First Vice-President.....E. F. Whitnall.
Second Vice-President....H. C. Kelling.
Secretary...............John A. Dahlman.
Treasurer...............Anton Hennecke.

The Board of Directors elected were: Henry Schmidt, William Gregory, F. C. Schultz and Ernst Winter.

Open house was held in the rooms of the exchange during the afternoon and evening, and the meeting was in every way a delightful affair.

At the same time that the above meeting was held officers of the Builders' Club were elected for the new year as follows:

President...............Nicholas Ehr.
First Vice-President.....Henry Schmidt.
Second Vice-President....Anton Hennecke.
Secretary...............S. J. Brown.
Treasurer...............A. F. Wagner.

Minneapolis, Minn.

Building figures for January show, so far as estimated cost is concerned, an increase of over 60 per cent. when compared with the opening month of last year. The actual number of permits issued last month by Building Inspector Houghton was 193, against 204 in January, 1908, but the total cost of new buildings thus authorized footed up to $377,840 last month, as against $225,005 in January last year. The figures for total cost of building started last month are exceeded by the figures of but one other January in the history of Minneapolis—that for January, 1906, when the total was $432,705.

Marked activity in church building is promised for this city during the coming season. At the annual meeting of the City Board of Extension for the Methodist Church held February 2, permission was given outright to five churches to begin the erection of new edifices at once. The list includes the Park Avenue, the Thirteenth Avenue, the Bloomington Avenue, the Penn Avenue and the Forest Heights church, and in each case it is planned to spend between $45,000 and $125,000. Two other churches, the Hennepin Avenue and the Prospect Park, have plans under consideration for new buildings, the former to cost approximately $150,000 and the latter $50,000. The report of the Building Committee of the board shows that eight other church buildings are now in process of erection under the supervision of the board.

The Board of Education has called on the Legislature for a bond issue of $900,000, to cover the cost of erecting new grade and high school buildings. The plans of the board provide for the erection of five new grade schools and the remodeling of a high school and three grade schools.

Work on the new federal building to be erected on the block bounded by Second, Third and Washington avenues and Second street will begin at once. Congress has already made an appropriation of $750,000 to begin the work, and at the present session an additional appropriation of $1,000,000 will be recommended.

The big building projects for the coming season that have so far been made public include the New England Furniture & Carpet Company's store at First avenue South and Seventh street, to cost $250,000; the L. S. Donaldson Company's department store additions at First avenue South and Sixth street, to cost upward of $300,000; the new Chamber of Commerce Building at Fourth avenue South and Fourth street, to cost about $200,000; the Shriner's Temple at Hennepin avenue and Sixth street, to cost $260,000; the Minneapolis Car Company's plant at Hopkins, to cost $500,000, and the Washburn Coupler Company's plant in the Minnehaha District, to cost $250,000.

Montreal, Can.

The Board of Directors of the Builders' Exchange recently issued, through Secretary-Treasurer John Herbert Lauer, the eleventh annual report of the organization, which contains much valuable information relative to the building situation in that city and the work which has been accomplished by the organization. According to the report there were 1807 permits issued in 1908 for building improvements valued at $5,062,326, while in 1907 there were 1472 permits taken out which called for new buildings and improvements valued at $8,406,136. In 1906 there were 1484 permits issued for improvements valued at $8,600,300. The directors of the exchange strongly favor a "flat rate" for the issue of permits, so that all temptation to place a nominal value on the amount of buildings may be removed and the city treasury receive a more adequate revenue to devote to an increased staff of inspection.

Reference was made to the attitude of the exchange toward legitimate trades unions, the point being made that it recognizes the value of co-operation alike to workmen and employers in raising the status and bettering the condition of both. Another point referred to in the report is the second Canadian Builders' Exhibition, under the direction of the Builders' Exchange, which was held in April last and which was highly successful in every way. The annual reception New Year's gave an opportunity to some 200 members to become better acquainted, while the summer excursion to Boston "was the most ambitious and successful trip yet taken."

It is proposed to establish a permanent exhibition of building materials in the new quarters of the organization which have been secured in the new Eastern Townships Bank Building on St. James and Victoria square. This is one of the finest and best located modern office buildings, being central and accessible by all car lines. The officials in presenting the report bespeak the hearty co-operation of the members of the exchange by exhibiting any materials which they handle or manufacture, so that architects and clients may benefit by having under one roof all that goes to make a modern building. Reference is made to the permanent exhibits which have been a marked success in many of the large cities of the United States and Great Britain in connection with builders' exchanges.

Newark, N. J.

The members of the Builders' and Traders' Exchange held their annual meeting on January 15, when all of the old officers and directors were re-elected. There were about 150 members in attendance, who listened with close attention to the various official reports. The secretary reported a membership of 159, a gain of 19 members for the year, while the treasurer reported a comfortable balance on the right side of the ledger. The officers for the ensuing year are:

President...............Thomas Boyle.
Vice-President...........Hugh Kinnard.
Secretary...............Charles M. Grover.
Treasurer...............L. C. Rusling.

After the business meeting had been completed a luncheon was served, and the programme of the evening was interspersed with music and other entertainment.

Nashville, Tenn.

The Nashville Builders' Exchange held an important meeting on the evening of January 15 at its headquarters in the Stahlman Building, when a number of interesting reports of officials were presented. These showed the organization to be in fine condition, with prospects for the future of a most flattering nature.

Retiring Secretary and Treasurer Haynes McFadden stated in his report that from the 46 firms who signed the original roll, the membership had increased to 91, with the organization only three months old on the first of January of the present year. The headquarters of the organization have proven well adapted to the uses of the exchange and the exhibit spaces are rapidly being taken. Plans and specifications of all Government work within a radius of 500 miles are upon request sent to the Builders' Exchange by the supervising architect of the Treasury Department, and a movement is now well under way to have the architects of Nashville file all of their plans at exchange headquarters. Some of the local architects are already doing this and it is felt that the practice will soon become general.

Suborganizations in the various branches of the trade, designed to bring the builders of Nashville into more friendly relations and to stimulate a better class of work, have been formed from time to time and with material progress in several branches. The exchange has taken a position on all public questions affecting its own welfare or the welfare of its members, and this stand has always commanded respectful recognition. Among the questions so taken up by the exchange have been the reappointment of Building Inspector B. J. Hodge; the appointment of three new members on the Board of Education; the appointment of competent inspectors for concrete paving work, and the adoption of revised specifications therefor, also the adoption of a municipal license law affecting contractors. The industrial education of mechanics as provided for in a bill introduced at the present session of the Tennessee Legislature bears the endorsement of the exchange.

The election of officers resulted in the following choice:

President...............R. T. Creighton.
First Vice-President.....Henry Griffin.
Second Vice-President....George N. Ingram.
Treasurer...............John Oman, Jr.

The directors elected include the following: Robert Elliott, James H. Peter, J. A. Cooper, Chas. Sykes, C. W. Rives, W. R. Smith, T. B. Agerton, A. Tillman Jones, T. J. Mooney, J. K. Bernard, H. F. Cooper, E. T. Lewis, George Phillips, A. J. Dyer, H. E. Parmer, John Bouchard, T. L. Herbert, Jr., Harry McAlister, W. E. Jordan, Clarence Sutherland, J. N. Means and H. C. Parrent.

The members extended a vote of thanks to the outgoing officers for the fidelity with which they had discharged the duties of their several offices.

New York City.

The conspicuous feature of the local building situation is the rush to file plans for apartments and tenement houses before the adoption of the proposed new building code which limits the hight of all non-fireproof tenements hereafter constructed to 59 ft. At the rate these buildings are now being planned the Boroughs of Manhattan and the Bronx will be provided with housing accommodations for some time to come, as practically every builder having vacant property on his hands is mentioned in the recent filings. It is not likely, however, that all of the improvements projected will be carried out immediately, but they tend to swell the total and give the impression of unusual activity in the building line. How great this recent activity has been is shown by the statement that in 10 days one quarter as many plans for houses were filed in Manhattan and the Bronx as were filed in the whole of last year.

The center of future activity is likely to be the Washington Heights section where in the last few weeks one interest alone has filed plans for 27 high-grade apartment houses, to cost about $4,500,000. This is in a large measure responsible for the gratifying increase over the same period a year ago, although it must be borne in mind that January, 1908, was the beginning of a slow recuperation from the severe business shock experienced in the closing months of 1907.

There has also been a little more new work than usual projected in some other portions of the city, so that the total for January this year is practically double what it was a year ago. While the permits issued in the Borough of Manhattan for January were 61, as compared with 42 the same month the year before the estimated cost of the new buildings was $6,005,000, as against $3,400,000 in January, 1908. In the Borough of the Bronx a little over 190 permits were taken out, as compared with 92 the year before for new work involving an estimated outlay of $3,000,000, as compared with $1,371,000 in January last year.

In Brooklyn about 600 permits were taken out for new work costing $3,693,676, while in January last year 266 permits were taken out for improvements, estimated to cost $1,363,185.

A new record for January building operations was established last month in the Borough of Queens, when plans were filed with the Bureau of Buildings for 286 structures, estimated to cost $1,106,743, while in the corresponding month of last year permits were issued for 213 buildings to cost $747,720, an increase of something over 48 per cent. A large proportion of the new work relates to dwelling construction in exclusive home sections, while another noticeable feature is the increased average cost of the new structures to be erected.

There seems to be a feeling in many quarters that the building industry in and about the city will show great activity this spring, although it is fair to assume that a large proportion of the work now being projected will not be executed for some time to come.

Oakland, Cal.

Building in Oakland and the suburbs was badly hampered by the weather throughout January, and a number of important projects are still being held up until conditions as to weather show an improvement. Nevertheless, the record of new construction has held up well, the total value of the building permits issued during January being $557,770, as compared with $597,643 during December and $538,153 for November.

A great deal of work, especially in the way of frame construction, is in the hands of the architects, and builders are confident that the amount of building put under way during the spring and summer will exceed even the large showing of 1907. There is a fair amount of activity in Berkeley, Alameda and the smaller surrounding towns, which if included in the Oakland showing would make the January record for this neighborhood the largest in its history.

Philadelphia, Pa.

The month of January shows a healthy gain in building operations over the closing month of last year, as well as exceeding materially the corresponding month in 1908. Statistics compiled by the Bureau of Building Inspection show 484 permits issued for 733 operations at an estimated cost of $1,677,025, a record exceeded only in the past decade in 1901, 1906 and 1907, which were banner years in the trade. A gain of over $722,000 is noted when the volume of business is compared with the same month last year, and it is now believed that a steady upward movement in the building trades will be experienced.

While operations in dwelling houses have not been so extensive during the month, the total for two and three story houses of this class being $551,000, the amount is comparatively good for the first month of the year. The city has figured quite extensively as a builder during the month, contracts for schoolhouses costing $571,000, and other municipal buildings, the estimated cost of which is $53,000, having been awarded. Considerable encouragement is taken in the future outlook. A number of large propositions will figure in the spring business, including among other things the $1,000,000 Curtis Publishing Company building, $500,000 extension of the Union League, several moderate sized office buildings, considerable municipal work, as well as several large propositions in manufacturing buildings. Additional propositions in the way of flat houses are under consideration, particularly in the West Philadelphia districts, where an expenditure of something like $500,000 for this class of work is expected.

In dwelling operations plans for considerable work are under way, one taking in a block of 126 houses in the northern section of the city, while one operation of 100 three-story houses and another of 57 are contemplated in West Philadelphia. Estimates for smaller operations embracing several hundred two-story houses are also being made by various builders. A busy season is expected in suburban building; several new tracts will be opened at an early date; plans for several quite pretentious dwellings are on architects' boards, as well as a good number of a more moderate character, and local builders expect to figure quite extensively on this class of work in the very near future.

The whole building situation, therefore, looks more favorable than for some time back, and it is believed that the present year will develop a very satisfactory one in all branches of the trade. The general labor situation is comparatively good, and while mechanics are not fully employed, the situation is rather better than it has been, particularly when the season of the year is taken into consideration.

Portland, Ore.

Builders of Portland are quite generally disappointed with the results achieved in January. Almost from the first day of the month till its close the month was one steady rainstorm, and builders were hindered both in the prosecution of work already contracted for and in the starting of new work. Even the issuing of permits for building to be done later on shows the effects of the weather, the total for the last month being only 177 permits for buildings, to cost $426,415, as compared with 269 permits for buildings, to cost $939,975 during the month of December.

Aside from a considerable amount of inside finishing, which was done in spite of the rains, the building situation stands now just where it did a month ago. The outlook is good, having been improved rather than otherwise by the abundant rainfall.

Of the buildings for which permits were obtained during January 79 were for frame dwellings, to cost $146,900; 9 were for frame business blocks, to cost $47,950; 4 were for reinforced concrete buildings, to cost $54,000; 5 were for brick buildings, to cost $120,000, and the remainder of the permits were issued for repairs, sheds, &c. Frame construction was most effected by the weather, but it is in this line that builders are expecting to make the best showing during the spring months. There are also plans drawn for a number of modern brick and concrete buildings, but most of these will hardly be commenced before April.

Portland, Me.

The annual meeting of the Portland Builders' Exchange was held on the evening of January 27, when the following officers were elected for the ensuing year:

President...............J. E. Harmon.
Vice-President..........J. P. Wescott.
Secretary...............William M. Howatt.
Treasurer...............Sylvanus Bourne.

The directors elected were N. E. Redlon, Sylvanus Bourne and J. H. O'Neil.

San Francisco, Cal.

Since January 1 more rain has fallen in San Francisco and elsewhere on the Pacific Coast than in any other like period at this season since the records have been kept, says our correspondent under date of February 5. During the entire month of January there were only three or four days when work on outside construction could be prosecuted. Nevertheless the record of permits and contracts was remarkably good, being much better than in December, thus indicating that there will be considerable activity during the spring.

The total value of the permits for new work issued during January was $2,166,309, as compared with $1,853,542 for December. The total number of building contracts issued since the great fire now amounts to $124,750. Building contracts were entered into in January for a total of $3,116,208, divided as follows: Brick, $2,000,732; frame, $1,038,716; alterations, $76,760.

The building operation of the first week in February have been limited chiefly to the smaller class of brick commercial buildings in the downtown section, although two larger structures, the new Marquis Hotel and the Newman & Levinson Building, have been contracted for.

Builders believe that the present year will be marked by the erection of a considerable number of fine residences and high-grade apartment houses and private hotels. This has been the most neglected sort of building since the fire, and the complaint is now made that there are no "dwellings for the rich." While rents for dwellings suitable for workmen and artisans and the smaller business men are becoming more reasonable, a number of more wealthy people claim that their desires in this regard can only be met at exorbitant prices.

Stocks of lumber, brick and other material are large, owing to the general suspension of actual building during the rainy weeks of the past two months, but prices are still held firm, and there seems to be no prospect of a drop in any line.

St. Paul, Minn.

Building figures for last month show a marked increase over the figures for the corresponding month of last year, both in the number of permits issued and in the estimated cost of work begun. There were 165 permits issued by the building inspector in January, as compared with 105 permits issued in the opening month of last year. The total estimated value of the work thus authorized last month foots up to $285,576, as against $197,184, the figures for January, 1908.

The remarkable thing about the present building movement here is that a most unusual number of residences of moderate cost are being erected. The largest permit taken out last month was for a $10,000 residence, but the great bulk of the permits were for residences to cost from $2500 to $6500. Nearly 100 residences of this type were begun during the month, and the present indications are that an even greater number will be started in both February and March.

The continued low price of materials is generally given as the main reason for the unexpected activity in house building, but the fact that cement and some other materials have shown a tendency recently to advance is not expected to effect the situation appreciably. The people have got the "build now" idea, and nearly all the local contractors have their hands full supplying the demand for new houses.

The seventh annual dinner of the Builders' Exchange was held at the Ryan Hotel on the evening of January 20, covers being laid for 350 members and guests. Delegations were present from the Builders' Exchanges of Minneapolis, Duluth, Faribault and Stillwater, while the guests included many prominent in building and architectural circles. President Rhodes of the St. Paul Exchange, welcomed the guests in a very pleasing and rather humorous address. During the dinner there were several amusing intermissions in the shape of presentations to the chairmen of the various committees of insignias of the office. J. M. Carlson, chairman of the Committee on Rooms, was presented with a broom; Treasurer Raymer was given a big key for the treasury door; Chairman Hennessy of the Finance Committee, was presented with a watch dog; John Roberts, a hobby horse to use in training in his next race for vice-president of the exchange, and Chairman Cameron of the Public Affairs Committee, with a gas meter, which purported to come from the gas company.

Another interesting feature of the evening was the 12 newsboys who came rushing into the dining room shouting "extra," in the latest approved style, and carrying copies of the Builders' Edition of the St. Paul *Dispatch*, on the front page of which was an extended account of the banquet with humorous reference to some of those prominent in the exchange.

Toastmaster McGuire introduced the various speakers, the first being Louis Betz, Comptroller of the city, who responded for the city of St. Paul and extended a cordial welcome to the members of the Builders' Exchange and their guests. W. A. Elliott, representing the Minneapolis Exchange, spoke of the warm feeling existing in that organization for the St. Paul association. President Webster of the Duluth Exchange, also had pleasant words for the organization, and he was followed by President Olson of the Stillwater Exchange. John O'Neil spoke on behalf of the Builders' Exchange at Faribault. Interspersed with the speeches were entertaining vaudeville numbers and the evening, as a whole, was most enjoyable.

Seattle, Wash.

Work is only now beginning to be resumed after the delays incident on the unusually heavy rains of January. The actual progress made in buildings under way was considerably below expectations during the last month, as there were very few days when outdoor work could be done to any great extent, and, though indoor work proceeded to a certain extent, the amount of this was considerably less than it would have been had the weather not interfered with general operations.

One of the important features of February will be the construction of numerous buildings for the Alaska-Yukon-Pacific Exposition. During the last few days no less than 24 permits for exposition buildings have been taken out, to cost an estimated total of $422,000. Of these, the more expensive are the Government Building, to cost $275,000; the California Building, to cost $73,500; the Forestry Building, to cost $72,000, and the Washington Building, to cost $70,000. Aside from the buildings built directly for exposition purposes, there will be a large amount of hotel, residence and other building in anticipation of the exposition.

St. Louis, Mo.

At a meeting of the Building Industries Association, held in the Century Building on January 12, the following officers were elected for the ensuing year:

President	O. G. Selden.
Vice-Presidents	C. L. Gray, W. M. Sutherland, Fred B. Adam.
Treasurer	S. M. Lederer.
Secretary	F. W. Choisel.

The directors elected were: C. O. Brainerd, D. G. Scott, E. F. Lasar, John L. Mesker, James A. McKim, E. J. Hanley, John T. Bradley, Jacob Mueller, C. W. S. Cobb, John P. Larson, Henry G. Rolfes, A. G. Fish, R. M. Gillespie, H. G. Eastman and C. A. Sinclair.

A bulletin service has been arranged by the officials of the association whereby advance information concerning buildings to be erected in and out of the city will be posted. At the meeting in question the principal speakers of the evening were: James H. Bright, one of the oldest contractors in St. Louis; R. M. Gillespie, past president of the Master Bricklayers' Association, and Fred B. Adam, one of the vice-presidents of the association.

Tacoma, Wash.

January made rather a poor showing in building. The weather was unfavorable throughout the month, and prospective builders showed little inclination to bring their plans to the final stage. The total value of the new construction authorized during the month was only $197,590, or but little more than half of the construction authorized during the month preceding, and considerably less than that for the same month last year. There appears, however, to be a considerable amount of prospective building in plan, and with good weather in the spring the poor start may be overcome.

Considerable interest attaches to the new building ordinance, which is now being put in shape for final passage. The new ordinance will increase the restrictions as to the fire limits, will limit the hight of buildings to 250 or 300 ft., and of reinforced concrete and wooden frame buildings to six or eight stories.

New Publications.

Practical Concrete Block Making. By Charles Palliser; 74 pages. Size, 5 x 7½ in. Numerous illustrations. Bound in board covers with side and back titles. Published by the Industrial Publication Company. Price, 50 cents.

The rapidly increasing use of concrete in building construction has turned attention to the hollow concrete block business to such an extent as to create a considerable industry in the manufacture of machines for turning out these blocks. The little work under review is designed as a simple treatise for the workman, explaining the selection of the materials and the making of concrete blocks and cement brick, giving directions for producing molds, together with some remarks on the methods of obtaining the best architectural effects.

The matter is presented under a series of headings, the first of which deals with cement and concrete, after which blocks, molds and machines, with directions for manufacturing the blocks are presented. The illustrations show the manipulation of the molds in producing desired effects. Wooden molds are illustrated and described, and some examples are given of the work produced. An interesting feature of the closing pages are standard specifications for blocks and the presentation of rules adopted by the National Association of Cement Users as to the testing of blocks. An index alphabetically arranged will be found to greatly facilitate reference.

Freehand and Perspective Drawing. Part I by H. E. Everett, Part II by W. H. Lawrence; 128 pages. Size, 6½ x 9¾ in. Profusely illustrated. Bound in board covers. Published by the American School of Correspondence. Price, $1, postpaid.

This is a manual of the principles of artistic perception and the art of correct graphic delineation, the author of the first part being connected with the department of architecture at the University of Pennsylvania, while the author of the second part is associate professor of architecture at the Massachusetts Institute of Technology. The volume is intended more especially for purposes of self-instruction and home study, great care having been used to bring the treatment of the subjects named within the range of the common understanding, so that the work will appeal not only to the technically trained expert, but also to the beginner and the self-taught practical man who wishes to keep abreast of modern progress.

The first part of the work, as indicated above, is devoted to freehand drawing, being comprised in the illustration of fundamental principles in which is pointed out the value of freehand drawing to the architect, with reference to the materials employed and the proper way to make use of them. This is followed by a number of elementary exercises, and these in turn by a series of plates representing common types of ornament, moldings, capitals, pilasters, friezes, &c., &c.

Part II, devoted to perspective drawing, is considered under two heads, the first presenting definitions and general theory, while the other treats of methods and problems in perspective, beginning with simple objects and continuing along by easy stages to the more complex matters.

Cement Sidewalk Construction. By Charles Palliser; 64 pages; 5 x 7 in. in size. Numerous illustrations. Bound in cloth. Issued by the Industrial Publication Company. Price, 50 cents, postpaid.

The methods of constructing cement sidewalks, curbs and gutters here described have been demonstrated over and over again by the author in his many years' experience, and the results of his observations are clearly set forth in such a way as to appeal to the workman. Full directions are given regarding the selection and testing of the cement, sand, stone, gravel, &c. A description of the special tools used is presented and the laying, finishing, coloring, &c., are treated in a practical way. In this book simple language has been used throughout, special attention being given to explaining the various technical terms so as to make the work useful to beginners in the business. The idea of the author has been to give reliable instructions how to make a sidewalk that will be durable.

Short Cuts in Carpentry. By Albert Fair; 80 pages; 5 x 7 in. in size; 75 illustrations. Bound in board covers. Published by the Industrial Publication Company. Price, 50 cents, postpaid.

This little book consists essentially of a collection of useful problems giving interesting methods of laying out and executing carpenters' work of various kinds. In the preparation of the matter it has been the aim of the compiler to give the principle involved in connection with the various subjects, so that the reason for the "short cut" would be readily understood. By this plan the young carpenter can first acquire a knowledge of the manner of correctly laying out the work, and second, how to do it quickly. Some of the subdivisions are devoted to the use of geometry, the method of making a miter box, getting out moldings of various kinds, kerfing, blind nailing, setting door jambs, hanging and fitting doors, laying floors, roof framing, veneering, inlaying, &c., &c. An interesting feature of the book is a large folding plate showing an interior view of a house with each part named.

Proposed Amendment to New York's Building Code.

Much serious concern is being manifested by architects, builders and real estate operators over the proposed amendment to the Building Code of Greater New York, which will in effect make it impossible to erect the six-story elevator apartment houses which have become a very popular type in the recent development of Washington Heights and the Bronx sections of the city. The recommendations of the Building Code Revision Commission presented to the Board of Aldermen early in February, while not specifically prohibiting six-story houses of the present type, provided that "all houses over 50 ft. high shall be of fireproof construction." This, builders point out, amounts to practically the same thing, as it will be impossible to keep a six-story house within this limit of hight and still comply with the provision of the Tenement House law calling for a hight of 9 ft. for all rooms " from the finished floor to the finished ceiling."

In discussing the proposed amendment, an official of a company largely operating in real estate points out that it will mean an additional cost of construction of about $100,000 for each building covering 100 ft. square on a corner, and will make it impracticable to build the six-story semifireproofed elevator house, as the income on the present schedules of rentals would not show a return on the investment, and the class of people who occupy these houses could not afford to pay a sufficiently high rental to pay interest on the additional cost. He further outlines the situation as follows:

" It may be argued by some that there is no harm in a law of this sort being enacted, as we all feared the Tenement House law when it was first proposed, but now find it a good law. It has had a tendency to cause the city to spread out and relieve congestion in lower Manhattan, but the proposed amendment will have the directly opposite effect. In order to overcome the additional cost of construction it will be necessary to build buildings 10, 12 or 16 stories in hight. The less expensive lands in the outlying districts cannot stand this class of improvement, as the buildings when finished would not be salable, nor would it be feasible to finance such large operations at the present time. The result will be that the builders will come back into Manhattan, tear down the old buildings, and erect the large apartment houses, thereby creating a congested condition greater than ever.

" It is not conceivable what argument was used to convince the commission that such an amendment is desirable. If it was to prevent the six-story 'walk-up' flat being erected, it would be easy to pass an amendment that no building over five stories in hight should be used for dwelling purposes unless it contained a passenger elevator. If it was because of the argument of the fireproof material people, who naturally have a great deal at stake in seeing such amendments passed, that the present form of construction is not sufficiently safe, it seems that the records of the Fire Department would readily answer this contention by showing that this form of construction has been one of the most satisfactory, and that we have had no serious fires, resulting in great loss of life or property, in the present type of six-story, semifireproofed, elevator apartment houses.

" The desirability of the present type of six-story elevator apartment houses can best be proved by visiting Washington Heights and the Bronx and seeing the high-class developments which have been produced through them and the character they give to the neighborhoods where they have been erected, as well as by comparing these with the sections of Manhattan which were improved with the five-story 'walk-ups.' No further arguments would be necessary to show that we don't want to be forced back to that type of construction."

Death of a Noted Architect.

It is with deep regret that we announce the death on February 11, at his home in East Seventeenth street, New York City, of Russell Sturgis, one of the best known architects of the city and a distinguished art critic and writer on architectural subjects. Mr. Sturgis was born in Maryland in 1837 and was graduated from the College of the City of New York in 1856. His architectural education was gained in offices in New York, in study at Munich and from reproducing plans of important buildings throughout the world. As a young man he was associated with P. D. Wight, the architect of the old Academy of Design at Twenty-third street and Fourth avenue, previous to which he was a student in the office of Leopold Eidlitz, one of the leaders of that time in the Gothic revival. Previous, however, to 1870 he had already gone into architectural and art criticism, contributing interesting and valuable articles to various publications. Mr. Sturgis was one of the first men in the East to work in fireproof materials, and before they were used elsewhere he constructed the Mechanics and Traders' Bank Building on State street, Albany.

Mr. Sturgis' work is represented in many buildings throughout the Eastern section of the country, and his writings form a part of every important collection of architectural works. Several of the Yale University buildings are from his designs and a number of large office buildings and residences in New York City were erected according to his plans. In conjunction with George Fletcher Babb he also designed the extremely picturesque Gothic savings bank in Auburn, N. Y.

The " Dictionary of Architecture " was his greatest literary effort, and architecture was the branch in which he made his most enduring fame. His chief compositions include " Manual of Jarves Collection of Early Italian Pictures," " European Architecture," " A Historical Study," " Annotated Bibliography of Fine Art," " How to Judge Architecture," " The Appreciation of Sculpture," " The Interdependence of the Arts of Design," " The Appreciation of Pictures," " A Study of the Artist's Way of Working in the Various Handicrafts and Arts of Design," and " History of Architecture."

WALTER THATCHER WINSLOW, a prominent Boston architect, recently died in that city, aged 65 years. He was a member of the firm of Winslow & Bigelow, and did the architectural work on such buildings as the Touraine Hotel, Shawmut Bank, Tremont Building, Siegel Building, Kidder, Peabody & Co.'s building and other large and important modern structures. He was a native of Cambridge, Mass., and received his early education in Jamaica Plain.

CONTENTS.

Carpentry and Building

NEW YORK, APRIL, 1909.

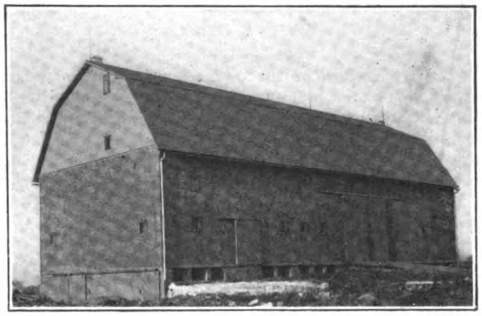
Concrete In Farm Barn Construction.

A VERY good example of the use of concrete in connection with barn construction is found in the farm barn recently erected for Dr. Sheldon Voorhees at Auburn, N. Y., and illustrated upon this and the pages which follow. The building takes the place of a large barn recently destroyed by fire, and in designing the new structure the owner desired to make it as fire resisting as possible at a minimum of cost. The pictures upon this page show the appearance of the completed building and also the framing before the exterior covering had been applied.

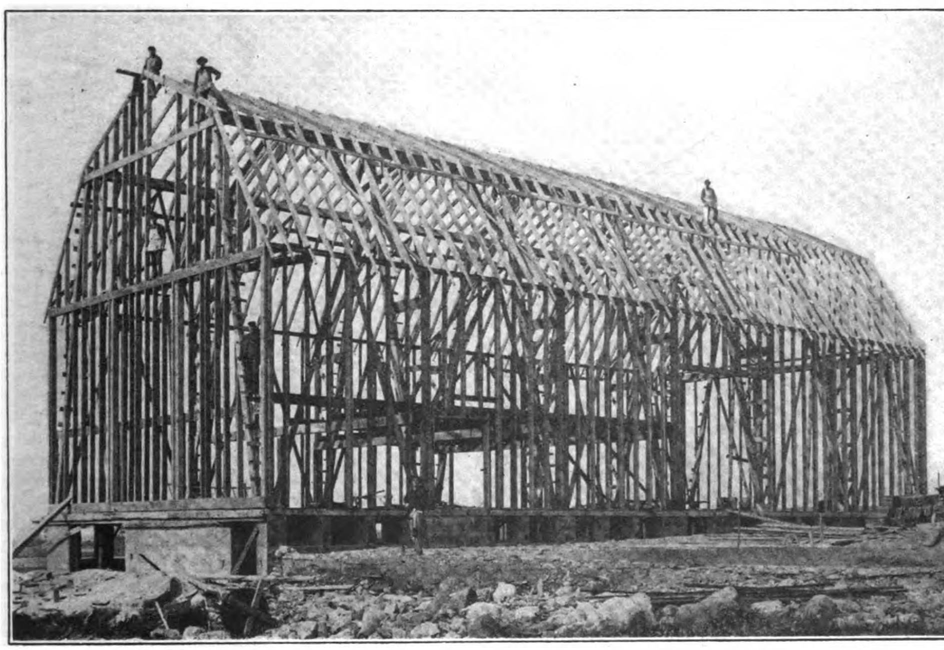
The barn is 40 x 96 ft. in area and has basement walls of concrete 18 in. thick. The superstructure is of frame, the outside of which is covered with cement on wire netting or lath fastened to the studs by staples. Cheap lumber waste from one of the factories was secured for "forms," inserted between the studding ½ in. from the outside surface, while portable forms, 4 x 14 ft., manipulated by ropes and pulleys, were placed in position 1 in. beyond the studding, and the intervening space of 1½ in. filled with carefully prepared cement for the exterior covering of the barn. An idea of just the manner in which the work was accomplished may be gathered from an inspection of the details presented herewith. The chief difficulty with this work was in securing a uniform thickness in the cement by properly adjusting the "forms" and in preventing the latter from warping or getting out of place. To accomplish this the "forms" were carefully constructed and secured to the building by means of bolts, as clearly indicated in the detail showing a section through the wall. The adjoining ends of the forms were kept true by means of keys inserted in the margin strips, as indicated in the partial elevation of the wall.

On the foundation walls the builders placed railroad rails 40 ft. in length supported by gas pipe posts standing between each two cow stalls. Over the steel rails was placed wire netting, as shown in the cross section of the main floor among the details presented herewith. Temporary "forms" were placed beneath, on which was laid 6 in. of concrete for the main floor of the barn. The builders state that although they were compelled to remove the "forms" under this floor in six days in order to make use of the timbers in the superstructure the floor remained in perfect condition. The roof of the barn is covered with slate.

The lower floor of the barn is devoted to cow stables, of which there is a row extending nearly the length of each side of the barn with a 12-ft. drive and feed way between. On one side there is also a calf pen and on the other side a bull pen. On the main or ground floor there are five horse stalls, a tool room, space for wagons, feed



View of Completed Structure.



Appearance of the Barn When Framing Had Been Practically Completed.

Concrete in Barn Construction.—Designed by the Owner.—Erected by Shawver Bros., Bellefontaine, Ohio.

bins and at one end extending the full width of the barn is the hay bay. At the end of the barn near the feed bins is a silo 14 ft. in diameter.

The planning of the barn was the work of Dr. Voorhees, while the construction was done under the supervision of John L. and Charles E. Shawver, Bellefontaine, Ohio.

We are informed that a description of this barn, which appeared in the local papers, attracted the attention of a special agent of the Swedish Government, who made a visit to Auburn and was so much interested in the method of framing and the possibilities of cement work as there exemplified that he ordered a complete model made for exhibition in the Academy of Science and Agriculture at Stockholm, Sweden.

The Carpenter and His Relation to Lumber Supply and Prices.

By E. S. Crull.

A great concern of the civilized world is the future lumber supply for building purposes. The people of the United States are confronting this problem to an absorbing degree, arousing the common interests of the nation. It is not the purpose of the writer to follow the various lines of action already familiar, but to present a feature that, seemingly, has received less publicity concerning carpentry in its relation to the better conservation of forest products in economical use.

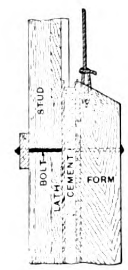
Granted that if each carpenter in this country can be influenced to make practical use each working day of but a single foot of the lumber that is now trimmed to make "even" lengths, or of lengths that are insufficient to have market value, the saving in a single year would be astonishing. There are any number of purposes that would permit the employment of many lengths that are now consigned to the fires, because carpenters steadily and persistently decline to make use of them. It is further submitted that the possibility to market but the choice portions of any product tends to advancing prices, and the disposition of contractors and carpenters has a decided influence on price and supply conditions, in accordance with that disposition in preparing bills of lumber.

It is without question a safe statement that more than 60 per cent. of the urban and rural dwellings, especially in this section, are constructed without drawings, except perhaps a rude sketch; or specifications of any sort, excepting a mere conversational understanding, and that the entire selection of the lumber is dependent on the carpenter or contractor in charge. A still larger percentage lacks a thoughtfully arranged bill of lumber dimensions. Even architects frequently omit this no less important item, relying on the carefully designed plans and specifications that are more general than specific.

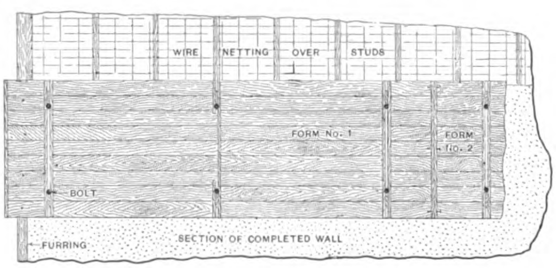
It is obviously impractical and inconsistent that an undertaking of such importance and significance to the home owner should proceed under the preparation that is little more at best than haphazard. The ulterior motive of the building contractor in the selection of lumber, where exists many opportunities of vantage, can scarcely be other than selfish as to the amount of profit and inherited opinions lacking later opportunities of changed conditions.

It is manifestly desirable to know the lengths and sizes of each piece of lumber required and the position it is best adapted to occupy on the building. Unquestionably, also, an accurately scaled cardboard model is a wise introduction in preliminary work. It serves the dual purpose of affording the client a more satisfying conception of the finished structure and enables accuracy in measurements and the bills of lumber material.

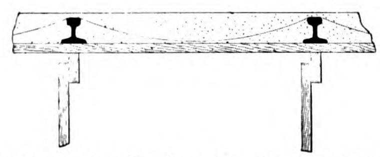
The architect and contractor would gain in a closer study of the market conditions, as well as frequent and friendly exchange of views between them and the local dealers in material. The preparation of bills should conform as much as possible to the availability of stocks, lengths and sizes, and the stocks of the dealers should also conform to the market supplies, availability and prices. Such interchanges between the constructors and the supply dealers does more than profit—it creates an amiable alliance and permits better service to the clientage.



Section Through Wall, Showing Use of the "Form."



Partial Elevation of Wall Showing Method of Construction.



A Section Through the Main Floor, Showing the Position of the "Form" and the Method of Reinforcing the Concrete.

Concrete in Barn Construction.—Some Miscellaneous Details.

Much of the false understanding of the layman as to building cost may be removed if there is sufficient interest displayed in the adaptation of the woods that are readily obtainable at better prices, instead of persistently clinging to failing supplies that no longer afford grades or competitive prices.

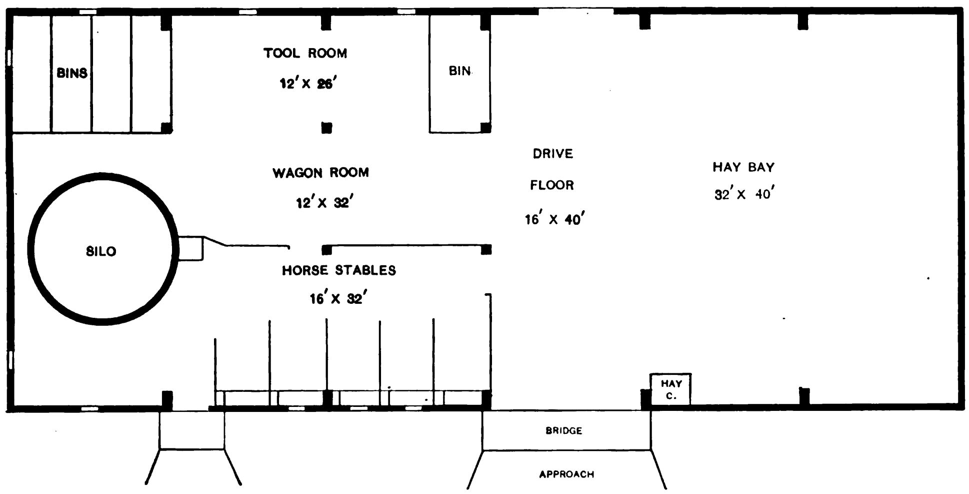
The time has passed for the general use of "the good old white pine," once so plentiful and satisfactory. The substitution of lumber that is obtainable is the sensible and reasonable course. The spruce of the Pacific Coast (more nearly resembling white pine than any other wood) grants a ready substitute for use as siding, finish and flooring; the South affords a supply of framing and protected material. It is to those sources we must turn, and the opposition will find disappointment in cost and availability. In the proportion that lumber, which is in scant supply is demanded, prices may be expected to advance.

Again, as to waste. The manufacturers of lumber and the dealers endeavor to supply the demands to the best of market conditions, but as the waste is so much the basis of prices be. The very finest of the growing timber produces scarcely 40 per cent. of "uppers" (the grades suitable for finish, siding, ceiling, flooring, &c.) with hardly 10 per cent. of "clear" in lengths of 16 ft. (universally specified in preference). It is the further endeavor to induce the use of material that unavoidably accumulates as waste. Grades lower than the very best are denied a ready market, though others are adequately suitable in repairing old or building new work of the cheaper classes.

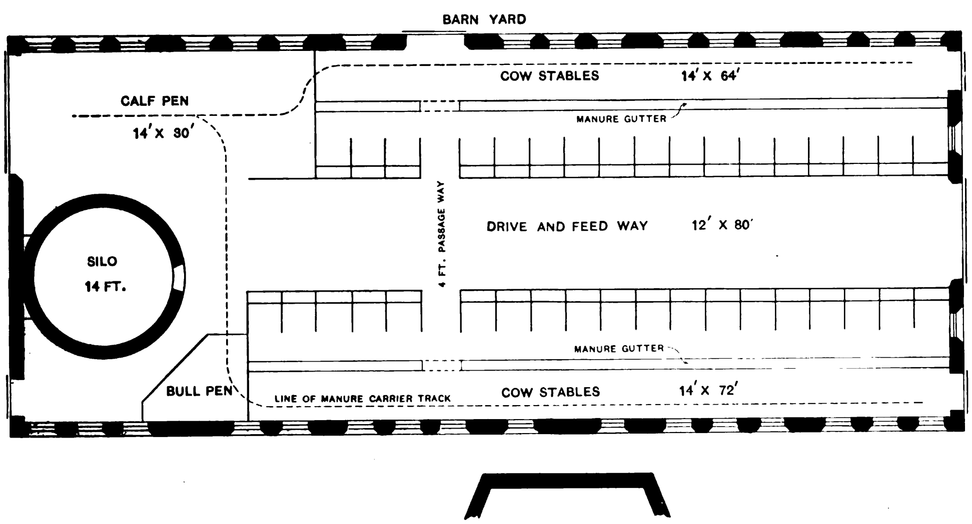
The loss from waste material cannot fall wholly on the manufacturer as so many are ready to believe, but more on the consumers. The price of the better must cover to some extent the loss. Saving may not be effected at the producing end if the consuming end continues in excessive and profligate waste.

Proper Position of Dining Room Windows.

The following comments taken from a recent issue of a Pittsburgh paper covers a point which may not be fireplace and pantry door were in the rear or end of the dining room. Side windows had to be depended upon for light, and with a house on the adjoining lot the side windowed dining rooms were all much darker than they would have been had the fireplace, china closet, &c., been built on the side and the windows in the rear looking out onto the backyard. One builder admitted that it would cost very little if any more to have built the fireplace at the side instead of at the end of the room, but that he had never given the matter much thought. That may be one reason why some builders have trouble in finding buyers."



Main Floor, Showing Hay Bay, Horse Stalls, Tool Room, &c.—Floor Is of Reinforced Concrete.



Basement Plan, Showing Location of Silo, Cow Stables, &c.

Concrete in Barn Construction.—Floor Plans.—Scale, 1-16 *In. to the Foot.*

without interest to contracting builders over the country.

A man who last week bought a home in the suburbs said yesterday that he looked at nearly a score of houses in different localities before making a selection. The property he bought cost him $7000, and he says he had trouble in finding what he wanted—a house with a window in the rear of the dining room. He says that speculative builders make a mistake in putting dining room windows in the side of the room, instead of in the back, especially when a house is built on a 20 to 30 ft. lot that is not on a corner. "In 75 per cent. of the houses I looked at," this man said, "the fireplace and china closet or

Reinforced Concrete in Church Building.

What is said to be the largest church of its kind in the West and which embodies a number of features of unusual interest is that of the Second Church of Christ Scientist, now being erected in Los Angeles, Cal. It covers an area 107 x 158 ft., and according to *Insurance Engineering* embodies among others the following constructive features:

The floors, beams, columns and roofs are of reinforced concrete, the most important of the structural features being the four reinforced concrete wall trusses and the dome carried upon same, as the trusses have a span of 68 ft. each and carry a total dead load of 350 tons. The trusses have a depth of 20 ft. at the supports and 10 ft. at the center, and are 16 in. in width. The reinforcement is designed in accordance with a new system, and consists of a light steel truss made up of angles and flat iron bars, so constructed as to carry safely the dead load of the wooden forms and wet concrete during the course of construction. Additional reinforcement consists of 12 1½-in. square twisted bars in the lower and six 1½-in. twisted bars in the upper chord of the truss to take care of the stresses due to the loads imposed after the concrete has set. The columns supporting these four trusses are 28 by 48 in. in section, and are reinforced with latticed columns of four 3½ by 3½ by ⅝ in. angles, having 2½ by ¼ in. lacing bars, with top and bottom bracket angles for the connection of the steel trusses.

CONVENTION OF BRICK MANUFACTURERS.

BOTH as regards attendance and the interest developed at the various sessions, the twenty-third annual convention of the National Brick Manufacturers Association, held at Rochester, N. Y., February 3 to 5, inclusive, takes rank among the most satisfactory gatherings of brick men in the history of the organization. The pleasure and comfort of the visiting delegates were greatly enhanced by the care with which they were looked after by the local committee, and the combination of exhibition room and convention hall under one roof proved to be a most advantageous arrangement.

The first session was held on the afternoon of Wednesday, February 3, when the Mayor of Rochester welcomed the delegates to the city and extended to them hearty greetings. The response was made by Charles A. Bloomfield of Metuchen, N. J., after which President M. E. Gregory delivered his annual address. Among other things, he touched upon the accomplishments and possibilities of the trade school as well as its importance to all concerned. He also referred to the scheme of a "Publicity Club," through which it is hoped to provide ways and means for the advertising and promotion of clay products for structural work, and at the same time to demonstrate to the building public the superior character of brick, tile, terra cotta, &c., and therefore increase the consumption of these materials.

Following the president's report was that of Treasurer J. W. Sibley, showing a good balance on the right side of the ledger. After the report had been accepted the election and installation of officers for the ensuing year was taken up.

Election of Officers.

The various officials were put in nomination, and after being seconded, the secretary was instructed to cast the unanimous ballot, the results being as follows:

President,
Lemon Parker, St. Louis, Mo.
First Vice-President,
Will P. Blair, Indianapolis, Ind.
Second Vice-President,
C. M. Crook, Youngstown, Ohio.
Third Vice-President,
Charles A. Bloomfield, Metuchen, N. J.
Secretary,
Theodore A. Randall, Indianapolis, Ind.
Treasurer,
John W. Sibley, Birmingham, Ala.

After the results of the election had been announced the new officers were installed, each making a brief address expressing his appreciation of the honor conferred upon him.

Next in order was a report of the Committee on Publicity, in which reference was made to the work it had accomplished, and the large number of articles that had been prepared and sent out to over 150 newspapers of the country. These articles "dwelt upon the folly of burnable construction, on the dangers of improper concrete construction, on the artistic possibilities of good brickwork," and kindred topics having a bearing upon the craft. The problem which the committee presented to the attention of the delegates was "How can we so teach the people that when they build they will use brick in preference to every other structural material?" In the opinion of the committee this must be done first by stimulating the interest already existing among architects in brick construction, and, second, by an intelligent and forcible appeal to the home builder himself. In order to crystallize the movement into something tangible, the committee asked power to solicit membership to a "Publicity Club," which should be duly organized into a business organization with a president, secretary and treasurer. It was suggested that the club conduct a competition in good brick houses, publish a book of designs, advertise it extensively and distribute it to the public. The secretary of the club upon sending out a copy of the book to a given inquirer notifies the members of the club who are located in the inquirer's market what he has done and that the inquirer is a possible purchaser of brick. By this method the committee thought the interests of the architect might be stimulated in the use of brick as a building material.

The importance of publicity work was discussed at considerable length by many members, the majority of whom were in favor of working along the lines indicated.

The second session of the convention was held on Thursday, February 4, when various papers were presented and discussed at considerable length. Among these mention may be made of "Burned Clay in the Construction of Small Buildings," by G. B. Waite of New York City; "What General Advertising Could Do for the Brick Manufacturers," by H. S. Houston, also of New York City; "Points of Perfection in Brick Pavements," by E. A. Fisher, City Engineer of Rochester, N. Y.

The third session, which was held on the afternoon of February 5, was taken up with some very interesting comments by E. S. Williams of the National Association of Builders' Exchanges, Scranton, Pa., on "The Power of Thorough Organization."

His remarks were followed by the reading of a number of papers, prominent among which was that on "The School for Bricklayers," by W. C. Smith, general director of the Winona Technical Institute, and O. C. Pierson, director of the department of bricklaying, Indianapolis.

Some questions for general discussion were then considered, followed by a paper by F. W. Fitzpatrick of Washington, on the relation of the architect and the manufacturer. This in turn was followed by "Transportation Problems of Importance to Brick Manufacturers," by John F. Lent, Pittsburgh, Pa., which provoked some interesting discussion, and the session concluded with the presentation of a paper on the "Clay Products Laboratory of the United States Geological Survey," by A. V. Bleininger, Pittsburgh, Pa., and which is published in another part of this issue.

The fourth session, on Friday, was also given up to a consideration of various papers and questions for general discussion. One of the notable contributions to the literature of the subject was that of J. E. Howard, Watertown, Mass., on the "Strength of Brick." This was also discussed by several members, including Professors Orton and Purdy.

In the concluding session a paper was read on the "Advantages of Electricity as a Motive Power in the Brick Business," by C. G. Guignard of Columbia, S. C., followed by one on "Setting Brick by Machinery," by R. C. Penfield, Bucyrus, Ohio. The latter was illustrated by numerous views showing the modus operandi.

ACCORDING to figures compiled by Bradstreet, the aggregate expenditure for building improvements in 83 cities of the country in 1908 was $591,191,042, as compared with $656,084,169 in the 12 months of 1907, a decrease of 10 per cent.

COMPETITION IN MODERN BUNGALOWS.

FIRST PRIZE DESIGN.

THE popularity of that type of dwelling commonly designated as the bungalow was strikingly exemplified in the widespread response to our announcement in December last of a competition in houses of this character. The Committee of Award into whose hands were placed the drawings submitted in the contest having completed its labors and rendered its report, it is our pleasure to present herewith the results of its findings, together with brief comments touching some of the more noticeable features of a few of the multitude of studies furnished for consideration.

An idea of the interest evoked by the contest may be gathered from the statement that a wide range of territory was represented, extending from Maine on the east to California on the west, and from Canada on the north to Florida, Mississippi and Texas on the south. Geographically classified, the New England States furnished 18¾ per cent of the total; New York, New Jersey and Pennsylvania, 26¼ per cent., of which New York State supplied more than half; the Southern States contributed 12½ per cent., as did also the Northwestern section of the country, with Michigan and Wisconsin in the van, while the Central West furnished exactly the same percentage as the New England States. From the Pacific Slope came 8¾ per cent., and Canada's quota was 2½ per cent. From these figures it will be seen that the interest was fairly well distributed over the entire country.

According to the conditions of the contest the designs to be submitted were to cover houses not to cost in excess of $3000 in that part of the country from which the drawings were sent, and any neat and attractive bungalow showing convenient arrangement and which could be well built for considerably less than this sum would receive just as much consideration at the hands of the committee as would the design which barely came within the limitations of the prescribed figure. The designs could be of "rustic" or "finished" architectural treatment, according to the taste of the architect, and of such a nature as to adapt them for the seashore, the lake, the mountains, or the suburban district, but the structure should not be more than one story or story and attic in hight.

The material to be used in the exterior walls was left optional with the competitor, and if the bungalow was intended for permanent occupancy rather than for simply the summer months, there should be a cellar under at least a portion of the building.

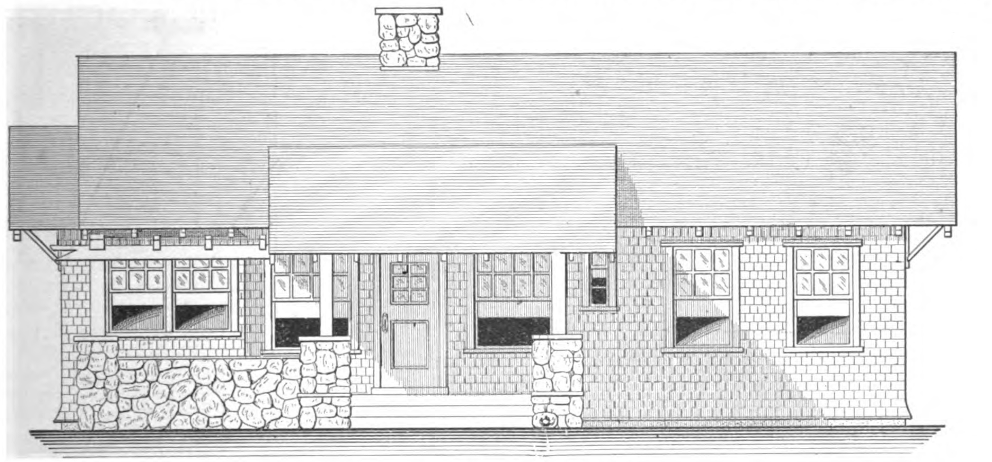
Contestants were at liberty to send in either original drawings or to forward those from which bungalows had already been erected.

Thoroughly modern construction, compact arrangement and attractive finish, considering the amount of money to be expended, were the points on which the Committee of Award was to base its conclusions.

An important requirement of the contest was an estimate showing the cost in detail of the work and materials included under each of several headings specified, as well as the cost of each in the aggregate. The cost of labor in connection with the various parts of the work was also to be given separately from the cost of the materials, together with current rates of wages per day or hour on which the various costs were based.

Another condition was that each estimate was to be accompanied by a certificate from some responsible builder that he would be willing to erect the bungalow indicated by the drawings and the specifications at the price named in the estimate.

The first work of the Committee of Award, therefore, was to ascertain if all the entrants had complied with the conditions of the contest as set forth in the December issue of *Carpentry and Building* and eliminate such as had failed so to do. The results of this close scrutiny were somewhat surprising. In many instances where the designs were of such merit as to otherwise invite favorable consideration the authors had failed to give the estimate of cost in detail, but had simply presented the aggregate figures under several headings in the briefest possible shape. In such cases the committee had no alternative but to regard them as out of the contest.



Front Elevation.—Scale, ⅛ In. to the Foot.

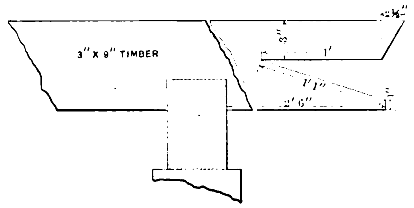
Competition in Modern Bungalows.—First Prize Design.—A. H. Fidler, Architect, Jamestown, N. Y.

Although it was distinctly specified that the bungalow was not to exceed $3000 in cost one competitor made his total nearly $21 more than this amount, thus destroying an excellent chance of winning a prize, as his design was admirable in many ways and his specifications and estimate were fully up to requirements. Some destroyed all hopes of a prize by placing their full name and address on the drawings and specifications, while others furnished designs that obviously could not be built for the money.

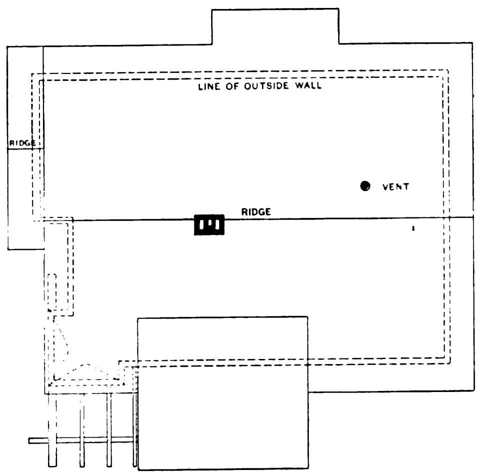
In the great majority of cases the designs provided a living room of liberal proportions generally fitted with an open fireplace, which constituted a means of heating, especially where the building was not intended for permanent occupancy. Where the latter was the case other means of heating were employed. The large open fireplace is usually regarded as a fitting accompaniment of the living room in a building of this type, and in many instances it was the central feature of an ingle nook, or was arranged with seats or bookcases on either side.

As regards the arrangement of the other rooms, especially the bath and sleeping rooms, the Committee of Award points out in its report some rather unusual features evidently reflecting a lack of care or disregard of convenience on the part of the authors designing the structures. It may not, therefore, be without interest to briefly refer to some of the bathroom arrangements, as noted by the committee.

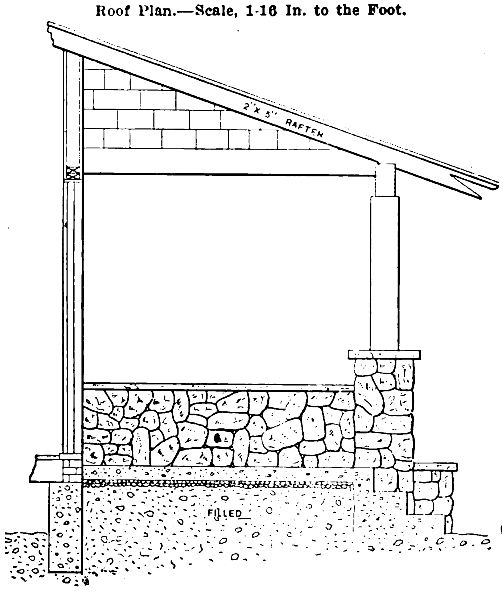
In one case the bathroom opened directly out of the kitchen and a bedroom so that the only way of reaching it from the other rooms was by passing through the kitchen or bedroom. Another located the bathroom next to the pantry and in such a way as to necessitate passing the bathroom door in going from the kitchen to the living room, which was evidently used also as a dining room, unless it was intended to eat in the kitchen. In still another case the bathroom was so situated that in order to reach it from the front bedroom it was necessary to pass through the living room into the dining room, then into the hall, out of which the bathroom opened. In one design the bathroom was widely separated from the bedrooms and located between the kitchen and dining room, so that it was necessary in going from one to the other to pass the bathroom door. In still another case the bathroom could only be entered from one or the other of two bedrooms, while the water closet was separate and opened from the rear porch and one bedroom. In order to reach it from the front bedroom it was necessary to pass into the living room, then through the dining room and kitchen on to the back porch, or else go through the bathroom and the other sleeping room.



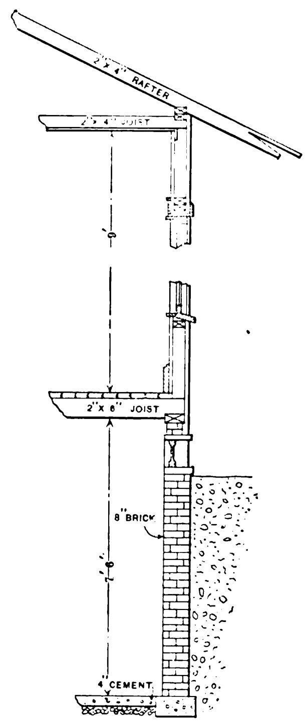
Detail of Pergola Roof Timbers.—Scale, ¾ In. to the Foot.



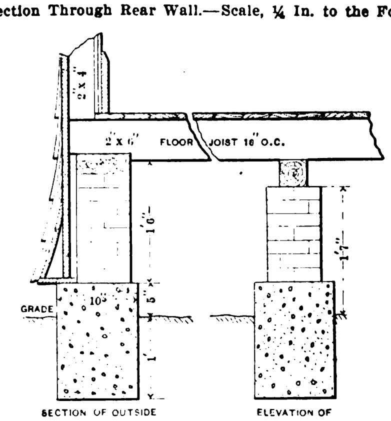
Roof Plan.—Scale, 1-16 In. to the Foot.



Section Through Front Porch.—Scale, ¼ In. to the Foot.



Section Through Rear Wall.—Scale, ¼ In. to the Foot.



Details of Foundation.—Scale, ½ In. to the Foot.

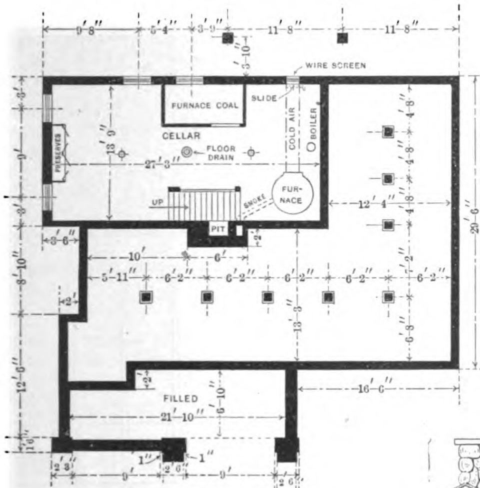
Competition in Modern Bungalows.—First Prize Design.—Miscellaneous Constructive Details.

The Committee of Award states that much difficulty was experienced in finally deciding upon the order of merit of the prize winners, as there were several studies which embodied special features of interest and suggestive value and so closely approximated each other that it was necessary to carefully weigh one against the other until the many sets of plans had been sifted to a prize basis.

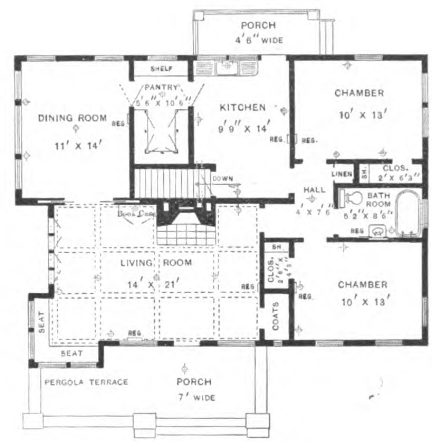
The decision of the committee is that under the terms of the contest, considering all the points involved, the best three sets entitled to prizes have been selected.

The committee decides that the first prize of $150 be given to the set of drawings submitted by A. H. Fidler, 135 Allen street, Jamestown, N. Y.; that the second prize of $90 be awarded the drawings submitted by W. H. Higginbotham, Hopkinton, N. Y., and that the third prize of $60 be given to the study furnished by Louis A. Clarke, Sixth and Spring streets, Los Angeles, Cal.

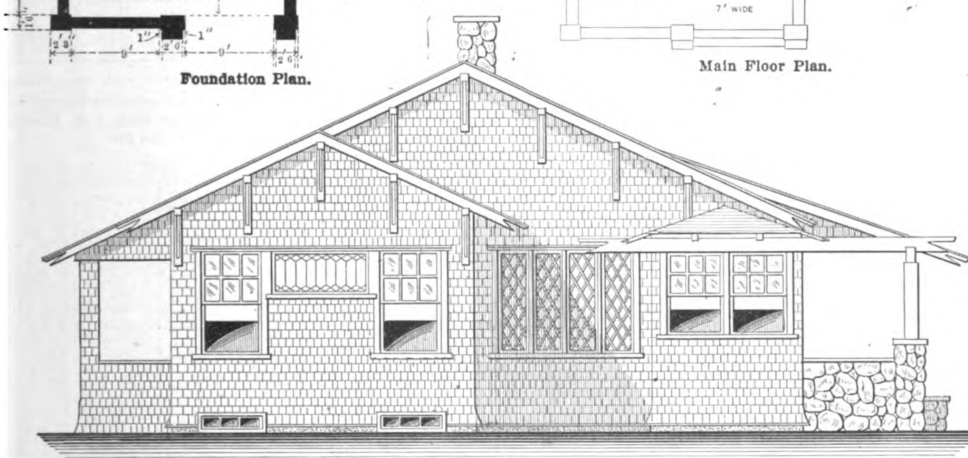
There were, as intimated above, several sets of drawings submitted which, while not entitled to a prize, received favorable comment at the hands of the committee, awarded the first prize in this contest, together with the specifications and estimate of cost. In commenting upon its selection for first prize the committee calls attention to the convenient arrangement of the rooms, the open fireplace in the living room, the seats at the corner where the shape of the building is such as to partake in a way of the nature of a bay window, the dining room separated from the kitchen by a commodious pantry, while in the kitchen the sink is placed under the windows where it has ample light and yet is convenient to the pantry. From the side hall both sleeping rooms and bathroom are readily accessible; each sleeping room is fitted with a commodious closet and the linen closet is conveniently placed as regards the various rooms. There is a cellar under a portion of the building wherein is located the



Foundation Plan.



Main Floor Plan.



Side (Left) Elevation.—Scale, ⅛ In. to the Foot.

Competition in Modern Bungalows.—First Prize Design.—Floor Plans.—Scale, 1-16 *In. to the Foot.*

and which in its opinion are worthy of "Honorable Mention" in this connection. These include the studies contributed by

W. C. Lester, 639 Mashy street, Memphis, Tenn.

Stanley H. Moore, McKinley High School, St. Louis, Mo.

Ira A. Worsfold, Dodge Building, Waukegan, Ill.

Jefferson D. Powell, 1238 Hubbard street, Jacksonville, Fla.

S. O. Burdick, Mead Building, Rutland, Vt.

William J. Wilkinson, 520 San Pablo avenue, Oakland, Cal.

James H. Young, 400 Bangor Building, Cleveland, Ohio.

Southron R. Duval, 606 Common street, New Orleans, La.

Many of these are of such a nature that we hope to publish some of them after the prize designs have been presented to the attention of our readers.

We take pleasure in presenting herewith the design furnace for heating, thus permitting the bungalow to be occupied the year round if desired.

Specifications.

The specifications relating to the design marked "Oddity," and awarded the first prize, read as follows:

Masonry.

Excavations.—Excavate for cellar as shown on foundation plan, same to be at least 6 in. wider than plans show, to allow plastering.

Excavate for outside wall footings and inner supports as shown on plans and in details. All earth not needed for grading or filling to be drawn from the premises.

Mortar and Concrete.—Use only clean, coarse, sharp sand, free from salt. Mixed three to one for cement mortar.

Concrete to be composed of one part Atlas Brand Portland Cement, two parts sand and five parts clean, broken stone, as large as would pass through a 2 in. ring and be caught by a ½ in. ring.

Brick.—Only good, hard burned local brick to be used throughout this work.

Boulders.—Use only large, hard, light colored boulders for porch walls, columns, piers, fireplace and all exposed parts of chimney, all to be laid up in colored cement mortar. Only brick to be used for backing boulders.

Cut Stone.—Cut stone for porch coping and chimney cap to be the best quality Ohio sandstone, with rough faces. Both coping and chimney cap to project 1½ in. and have ¼ in. drip on under side.

Cellar Walls.—Build up cellar walls of brick 8 in. thick, plastered on the outside with cement mortar and neatly pointed on the inside.

Chimney.—Construct chimney as required by drawings, carrying it up true and plumb, so that in no case shall there be less than 6 in. between smoke flues and any timber or woodwork. Chimney to be of brick, with all exposed parts faced with light colored boulders. The chimney must be built free and independent of the frame.

The flues to be run direct and to the top of chimney independent of each other. Partitions to be 4 in. thick and of brick. Flues shall have a fire clay lining, which shall run the entire altitude of the chimney, through cap, and there be cemented tight. Run the furnace flue down to within 2 ft. of the cellar floor.

Furnish and set 6 in. thimble for kitchen stove where shown on plan, same to have C. I. casing. Furnish and place iron door for cleanout to furnace flue in cellar.

Cement Work.—Lay cement footings for brick walls and supports as shown on details.

Front porch and pergola floor to be laid on 2 in. broken stone, cement to be 4 in. thick, finished off with a smooth, even surface, sloping ¼ in. to the foot away from the building.

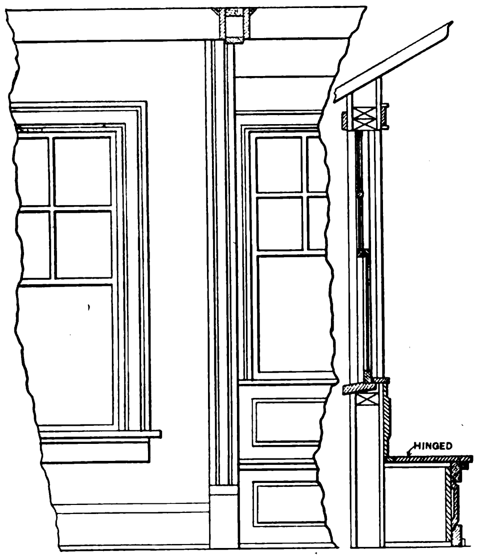
Fireplace hearth to be concrete 2 in. thick and marked off in 8 x 12 in. rectangles.

Cellar floor to be laid as follows: Excavate 6 in. below level of finished floor. Lay 2 in. of broken stone; over this spread 3 in. layer Portland cement and ram well. Cover this with 1 in. finishing coat of Portland cement and sand mixed equal parts, all to grade toward floor drain. Concrete and finishing coat to be laid in flags not to exceed 30 sq. ft., and all joints between flags to be filled with asphalt, applied hot.

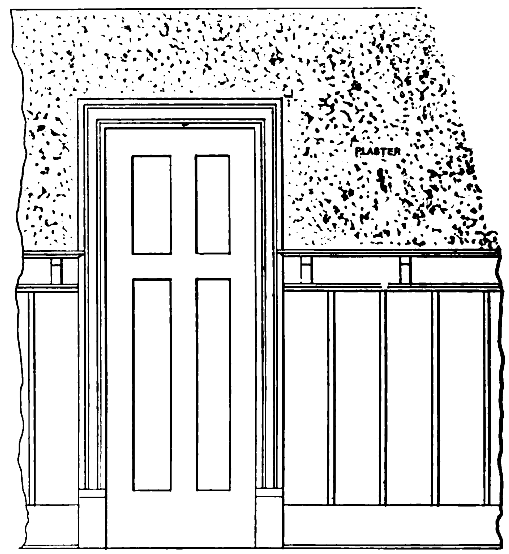
Ash Pit.—Ash pit in cellar to have cement bottom sloped to the front, with heavy cast iron door and hasp. Ash duct from fireplace to be lined with 8 x 8 in. terra cotta lining and iron cap at fireplace.

Lathing.—All walls, ceilings and work furred off throughout the building to be lathed with sound pine lath, free from bark, knots, pitch or anything liable to discolor the plaster, same to be put on ¼ in. apart and well nailed. Joints to be broken at every tenth lath. No lath to be put on vertically nor through behind studs from one room to another.

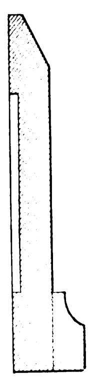
Plastering.—Cover all lath just described with King's Windsor. Carry the mortar down back of all base boards to the floor. The plastering throughout to be the best two-coat work, a scratch coat and a brown coat well trowled down.

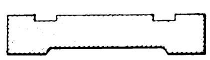


Elevation and Section of Seat, Showing Elevation of Windows and Trim.—Scale, ⅜ In. to the Foot.

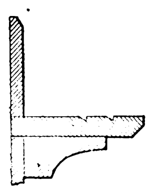


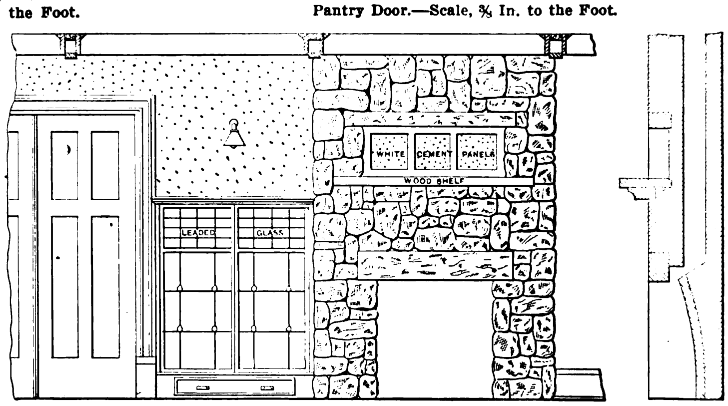
Elevation of Dining Room Wainscoting and Plate Rail, Showing Pantry Door.—Scale, ⅜ In. to the Foot.





Section of Trim.—Scale, 3 In. to the Foot.





Section of Base. —Scale, 3 In. to the Foot.

Section of Plate Rail.—Scale, 1½ In. to the Foot.

Elevation and Section of Fireplace, Showing Bookcase and Sliding Doors.—Scale, ¼ In. to the Foot.

Competition in Modern Bungalows.—First Prize Design.—Miscellaneous Constructive Details.

Carpenters and Joiners Work.

The carpenter shall do all cutting of timber, &c., as may be required by the other trades for the due execution of their work.

Framing.—All rough lumber to be sound hemlock without shake, and sized as follows:

		Inches.
Sills		8 x 8
Floor beams		4 x 4
Floor joist	16 in. crs.	2 x 6
Ceiling joist	16 in. crs.	2 x 4
Rafters	32 in. crs.	2 x 4
Oustide studs	16 in. crs.	2 x 4
Inside studs	16 in. crs.	2 x 4
Hips		1 x 6
Collar beams		2 x 4
Plates		2 x 4
Bridging stuff		1 x 3

All framing must be at least 2 in. from the chimney. Set all joist crowning edge up and bridge well, at least every 6 ft.; in no case shall bridging be nailed before ends have been cut to the proper angles. All nails to be wire, of large size, used without stint.

Studing to be doubled at all corners and openings for doors and windows. Studs to be well nailed to sills. Double hangers over single doors and truss over sliding door.

Grounds and Beads.—Put up ¾-in. grounds to receive all inside finish around openings and at bottom of partitions. Also all grounds for attaching plumbing fixtures. Place beads at corners to receive plastering.

Inclosing.—Cover entire frame with ⅞-in. hemlock boards, making joints on studs only and nail securely.

Building Paper.—Cover all sheathing with black building paper lapped 3 in., same to extend under all finish.

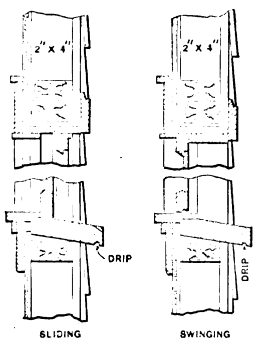
Roof.—Cover entire roof, excepting that projecting beyond the walls, with ⅞-in. hemlock boards well nailed. Projecting rafters to be covered with ⅞-in. M and D fencing.

Shingles.—Cover all building paper on walls with extra A cedar shingles, laid 6 in. to the weather.

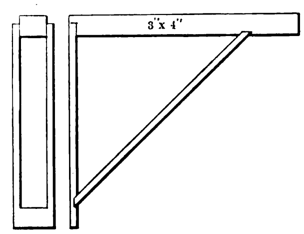
Entire roof, including projection, to be covered with best quality extra A cedar shingles, laid 5 in. to the weather and every sixth course doubled.

Windows.—All wood frames to be of No. 2 clear pine, as follows: Pulley stiles, ⅞ in. thick and ½ in. blind stops, ½ in. parting strips, ½ in. sash stops. All sash to be No. 1 clear pine, 1½ in. thick. Sills to be 1½ in. thick. Casing 1 in. thick, molded as shown in detail.

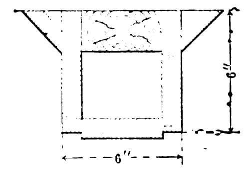
All window stops to be secured with round headed screws. Sliding sashes to be hung with iron weights and Silver Lake Spot sash cord, finished to run smooth and even. Swing windows to be hung with three 3 in. copper hinges.



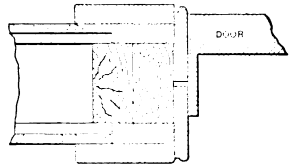
Details of Window Frames.—Scale, ¾ In. to the Foot.



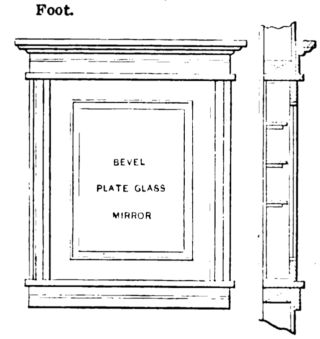
Front and Side Elevation of Timbers Supporting Gables.—Scale, ½ In. to the Foot.



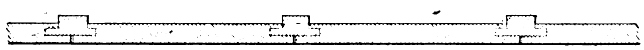
Section of Beams in Living Room.—Scale, 1½ In. to the Foot.

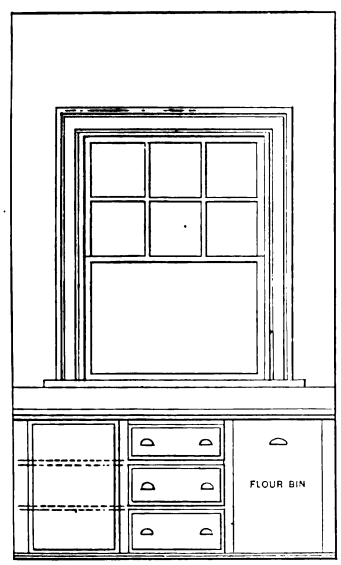


Section Through Interior Door Frame.—Scale, 1½ In. to the Foot.

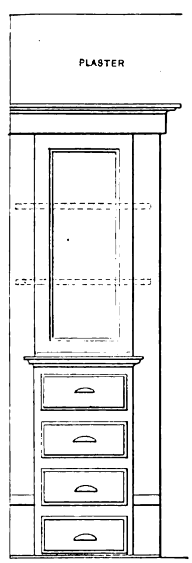


Elevation and Section of Medicine Cabinet in Bathroom.—Scale, ½ In. to the Foot.

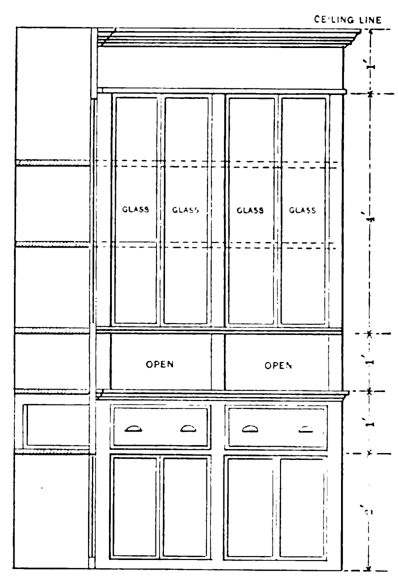

Section of Wainscoting in Dining Room.—Scale, ¾ In. to the Foot.



Elevation of Pantry Shelf.—Scale, ⅝ In. to the Foot.



Elevation of Linen Closet. —Scale, ⅝ In. to the Foot.



Section and Elevation of Pantry Cupboard.—Scale, ⅝ In. to the Foot.

Competition in Modern Bungalows.—First Prize Design.—Miscellaneous Constructive Details.

Cellar sashes to be hinged at the top with two 3 in. steel hinges, and supplied with hook for holding open.

Exterior Finish.

Porch columns, timbers supporting gables, pergola timbers and rafters projecting beyond the walls to be of surfaced cypress, constructed as shown in details. Run a 7/8 x 2 in. strip in gables under edge of shingles.

Back Porch Floor.—Floor to be of 1 x 4 in. No. 2 Southern pine, tongued and grooved, and pitched to throw off water.

The ceiling to be clear cypress sheathing, with 1½ in. molding. Steps to be constructed of 2 in. plank stringers, 1½ in. tread and 7/8 in. risers. Treads to have round nosing and scotia under.

Side of porch under floor to have lattice opening to allow circulation of cold air for furnace.

Interior Finish.

All to be of the best of the several kinds and kiln dried at the mill.

Finish of Rooms.—Finish the living room and dining room in common oak of good grain and even color. The remainder of the rooms to be finished in clear cypress. No finish in the cellar.

Floors.—The living room, dining room, hall and bedrooms to have a 7/8 x 3 in. tongued and grooved North Carolina pine floor, blind nailed to every joist. In no case must a dark and light strip be laid side by side. Kitchen, pantry and bathroom to have No. 2 " Perfection " maple floor.

Doors and Jambs.—All door jambs to be 1¼ in. thick, except sliding door jambs, which are to be 7/8 in. thick.

The doors to be clear cypress, 1½ in. thick, of the four panel type, as shown in details. Coat room and closet doors to be 2 ft. x 6 ft. 8 in., 1½ in. thick, with a full length mirror panel back.

The front door to be 3 ft. x 7 ft. 2 in., 2 in. thick, with six lights above and one wood panel below, as shown in front elevation.

Door and Window Finish.—Casing to be 1 x 5 in., mitered at the ends, and of design as shown in details. Windows to have 1 in. stool and 4 in. aprons.

Base and Moldings.—The living room, hall and bedrooms to have 9 in. base, as shown in detail, with molding. Base in living room to be of oak, all other rooms cypress.

Wainscoting.—The dining room to be wainscoted 5 ft. 6 in. high, with oak wainscoting. Cap wainscoting with oak plate rail as shown in details.

Bathroom to be wainscoted with narrow matched and beaded cypress boards, 5 ft. high, with a 7/8 in. molded cap. Both dining room and bathroom wainscoting to have shoe strip at the bottom.

Beamed Ceiling.—Construct in living room box beams on the ceiling, with one-half beam around the walls, as shown by dotted lines on plan. Plaster between beams.

Closets and Presses.—All closets and presses to have suitable clothes hooks every 10 in., placed on a 7/8 x 4 in. molded strip extending around the room. Each bedroom closet to have three shelves as shown on plan.

Pantry to have counter shelf in front of window, with flour bin, drawers and enclosed shelves below. Pantry shelving to be enclosed as shown in details. All to be built of cypress.

Linen Closet.—Linen closet to have four drawers below and two shelves above, enclosed with paneled doors according to detail.

Medicine Case.—Build recessed medicine case in bathroom, over wash basin, same to have plate mirror panel in door, as shown in detail.

Window Seat.—Construct in bay of living room an oak seat as shown in plan and according to detail.

Bookcase.—Construct in living room an oak bookcase with leaded glass doors, as shown in detail. Case to have drawer below and three movable shelves enclosed.

Preserve Cupboard.—Construct in cellar preserve cupboard, same to have four enclosed shelves above and two open shelves below, all of cypress.

Angle Beads.—All plastered corners to be furnished with " Parker " or other acceptable metallic angle beads to a hight of not less than 5 ft.

Door Checks.—All doors throughout the building must have (unless otherwise directed) hardwood turned door checks with rubber tips, same to be secured to the base.

Coal Bin.—Construct coal bin where shown on cellar plan, same to be of rough hemlock 2 x 10 in., well nailed to 2 x 4 in. studding, spaced on 12-in. centers. Door to be provided with strap hinges and hasp.

Cellar Stairs.—Cellar stairs to be of hemlock with 2-in. stringers, 1¼-in. treads and 7/8-in. risers.

Hardware Trimmings.

The contractor to estimate the sum of $35 for all locks, bolts, butts, latches, knobs, &c., the owner to select the above. The contractor to furnish, exclusive of the above mentioned, all sash cords and weights, pulleys, nails, sliding door hangers, &c. Sliding door hangers to be " Lane's trolley " parlor door hanger and track.

Tin Work.

All tin used throughout this building to be Taylor's XX " old style " redipped. Flashing around all openings, vent pipe, chimney, &c., to extend well under the shingles.

Gas Fitting.

Pipe building for gas with the best wrought iron gas pipe of the required sizes, same to have outlets where the designation " a circle and a cross " occurs. Run separate pipes for fuel gas to range in kitchen, fireplace and hot water boiler in cellar. All pipes to be properly graded and fastened, leaving them ready to be connected with the meter. This work to be done according to gas companies rules.

Heating.

This bungalow to be heated by hot air, the furnace to be of ample size to heat entire building to 70 degrees in zero weather. Furnace to be portable with all connections, firing tools and galvanized iron smoke pipe with dampers, &c. Cold air duct to be of galvanized iron with slide at wall opening as shown on plan. Air duct to have heavy wire screen at entrance.

Hot air pipes to be bright tin, double thick, and of ample size to heat rooms, same to be securely fixed in place, with all elbows, boxes, plastering rings, &c., complete.

Furnish all registers and place as follows: Those in living room and dining room to be of dull copper; those in bathroom and bedroom to be nickel plated; one in kitchen to be black enamel of plain stock design.

Electrical Work.

Building to be wired for electric lights, according to the rules and regulations of the Board of Fire Underwriters.

Switches to be within easy reach on side walls for all ceiling lights. Switch for porch light to be just inside the front door. All switches to be of approved flush push button type with dull copper plates in living and dining rooms. All others to be dull brass.

Run feed wire from a convenient point for service to enter building, same to run to central distributing box in hall, with meter in the cellar. Run from distributing box feed wires to points marked + on drawings. All wire must be run on porcelain knobs in such a manner as to prevent it coming in contact with any part of the building. All wire must be of the best grade, rubber covered, soft and pliable and 98 per cent. copper. Distributing box to correspond with finish of hall.

Electric Bells.—Provide and set up, in good working order, electric bells to ring in the kitchen indicator as follows:

One from front door.

One from rear door.

Provide suitable open circuit wet batteries and use only best insulated wire. All to be warranted for one year.

Lighting Fixtures.—Furnish and connect to outlets combination gas and electrical fixtures, with 16 candle power lights, except lights on living room ceiling, in coat room and on front porch, where only electrical fixtures shall be placed. Cellar lights to be hanging bulbs, with switch at top of stairs.

Painting and Glazing.

Roof Shingles.—Shingles to be stained twice in Cabot's Creosote Shingle Stain. First coat to be given shingles by dipping them three-quarters their length and the second to be applied with a brush.

Wall Shingles.—Shingles to be given two coats of boiled linseed oil.

Exterior Woodwork.—All exterior woodwork to be given two coats Cabot's Stain, above to include projecting rafters, roof under the eves, porch columns, all pergola timbers, sashes, &c.

Pine Flooring.—All pine flooring to receive one coat white shellac and two coats Johnson's floor varnish.

Maple Flooring.—Maple flooring in bath room to receive one coat shellac and two coats best varnish, last coat to be well rubbed to a dull finish.

Maple flooring in the kitchen and pantry to have two coats of oil well rubbed.

All dressed woodwork in cellar, including preserve cupboard, stairs, &c., to be given two coats good paint.

Wainscoting in dining room and bathroom to be given one coat good paint on the back before it is put up.

All cypress finish to be given one coat white shellac and two coats Pratt & Lambert's No. 31 preservative.

All oak finish in living room and dining room to be stained with one coat Johnson's No. 130 weathered oak and one coat Johnson's No. 40 Antwerp paste wood filler and two coats of Johnson's prepared wax.

Doors.—All doors opening off dining room and living room to be finished to match woodwork. All doors opening off hall and bedrooms to receive one coat dark mahogany stain and two coats Johnson's pepared wax.

All doors opening off kitchen to be given one coat shellac and two coats Pratt & Lambert's No. 31 preservative.

Glass and Glazing.—All sashes to be glazed with double thick American sheet glass, well tacked and puttied.

Doors in the bookcase to have leaded glass, as shown in details.

Tinting.—Plaster between beams in living room to be tinted a dark cream and walls a dark tan.

Dining walls to be tinted a medium dark blue-gray with cream ceiling.

Bathroom and back bedroom to have pale blue walls with white ceiling.

Front bedroom to have light tan walls and light cream ceiling.

Kitchen, pantry and hall tinted a Nile green with ceiling to match.

Plumbing.

All plumbing materials shall be of the best, free from defects of any kind. All excavating and filling required for the plumbing shall be done by the mason contractor. The plumber shall furnish all materials and labor and perform all work in a workmanship manner, in accordance with the drawings and this specification.

Cast Iron.—All C.I. iron pipe to be sound, smooth on the inside, cylindrical, free from cracks or sand holes, and of uniform thickness.

Lead Pipe.—All lead pipe used for soil, waste, vent or supply pipes to be best quality, extra heavy.

Water Supply.—Run from the street water supply pipe into building with stop cock inside cellar wall. Supply pipe to be 1-in. lead pipe. Run galvanized iron pipe for hose connection to side of front porch and one to the rear, same to have detachable handle faucet.

Soil Pipe and Sewer Supply.—Run 6-in. tile sewer pipe from street to house, from which run 4-in. cast iron soil pipe to be connected under fixtures. All to have necessary Y's, &c., to connect all fixtures.

Fixtures.—Furnish and fit up, complete, and in good working order, the following:

Water Closet.—Closet in bathroom to be a siphon wash-down closet with tank, seat and cover. Seat to be 1¼-in. plain oval and cover attached with plated brass hinges. Tank to have round corners, with chain and pull.

Bath Tubs.—Place in bath room a 5-ft. white enamel, 3-in. rolled rim tub, provided with combination bibs, rubber plug and sprinklers.

Lavatories.—Place in bath room a 20 x 24 in. slab, 12 x 15 in. bowl and 12-in. back lavatory, same to be of cast iron white enamel with apron and supported on hidden brackets.

Sink.—Place in kitchen a white enamel sink, 18 x 30 in. and 6 in. deep. Sink to have 12-in. high rolled back in one piece, same to have bracket support and drain board either side, as shown on plan.

Hot Water Boiler.—Place in cellar a 30-gal. hot water boiler, with horse-shoe burner.

Color Scheme.

Walls from cement footings up to be weathered shingles, with all woodwork, including window frames and sashes, stained a rich brown. Roof shingles to be stained a moss green.

DETAILED ESTIMATE OF COST.

The design awarded first prize in this competition was accompanied by the following estimate of cost:

EXCAVATING.

Teams per day, $5; labor per day, $2.

Loosening the soil	$12.50
Excavating and hauling	36.50
Total	$49.00

MASON WORK.

Masons per day, $4; cost of local brick per M, $9; cost of cement per cubic foot, 40 cents.

Cost of stonework (including fireplace)	$75.00
Cost of brickwork	144.00
Cost of cement footings	44.00
Cost of cellar floor	38.20
Cost of porch and pergola floors	40.00
Total	$341.20

CARPENTER WORK.

Carpenters per day, $2.50; hemlock lumber per M., $24; cedar shingles per M., $4.

Joist	$60.00
Studs	66.00
Rafters	15.36
Plates	6.60
Furring and bridging	8.00
Sheathing	51.00
Roof boards	36.00
Rough lumber	22.00
Building paper	3.00
Pine flooring	52.00
Maple flooring	18.25
Outside trim	116.00
Above to include front and back porch, pergola and gable timbers.	
Shingling roof and walls	120.75
Doors and trim	143.00
Windows and frames	182.00
Above to include glass, weights and cord, &c.	
Base boards	18.00
Wainscoting	25.00
Plate rail	6.00
Cased beams	32.00
Bookcase	12.00
Linen closet	16.00
Pantry complete	32.00
Window seat	8.00
Medicine case	5.00
Preserve cupboard	5.00
Hooks and shelves for closets	2.50
Door stops	.50
Drain boards for sink	2.50
Cellar stairs	10.00
Coal bin	12.00
Finished hardware	35.00
Rough hardware	25.00
Total	$1,146.46

PLASTERING.

Plasterers per hour, 50 cents; plastering per square yard, price to include lathing, 30 cents.

Plastering complete	$145.00

TIN WORK.

Tinners per hour, 60 cents.

Tinners' work complete	$10.00

HEATING.

Hot air furnace, as specified and installed	$95.00

ELECTRICAL WORK.

Electricians per day, $3.50.

Wiring and bells complete	$40.00

PAINTING.

Painters per day, $3. The figures below to include all interior woodwork, dipping of shingles and all exterior wood painting and staining.

Painting complete	$150.00

GAS AND ELECTRICAL FIXTURES.

Electrical and combination gas and electrical fixtures complete and set as specified	$40.00

PLUMBING.

Plumbers per day, $4.

All plumbing as specified	$200.00

COSTS ASSEMBLED.

Excavating	$49.00
Mason work	341.20
Carpenter work	1,146.46
Plastering	145.00
Tin work	10.00
Heating	95.00
Electrical work	40.00
Painting	150.00
Gas and electrical fixtures	40.00
Plumbing	200.00
Total cost of materials	$2,216.66

The builder's certificate accompanying the drawings was signed by O. H. Lilly, 122 Wilson avenue, Jamestown, N. Y., and reads as follows: I hereby agree that I would be willing to erect this bungalow, according to the drawings and specifications for the amount stated above, plus 5 per cent. for my work, making the total cost $2327.49.

SOME COMMENTS ON COUNTRY SCHOOLHOUSES.

SOME interesting comments on the planning, heating, lighting, ventilation and sanitary conveniences of country schoolhouses are contained in a paper read before the Congress of the Royal Sanitary Institute at Cardiff, Wales, by David Pugh-Jones, county architect, Glamorganshire, and from it we present the following extracts:

Whichever method of planning is adopted such as the central hall, the semidetached hall, or corridor system, the general arrangement should be as simple and direct as possible, with all parts well lighted and ventilated. The central hall may be made use of as an assembly hall for special instruction or lessons, lectures, drills and as a means of assisting the ventilation of the classrooms particularly in the winter, as fresh and warmed air could be admitted through the central hall. Glazed screens between the classrooms and the hall assist the lighting, and with folding glazed partitions a larger hall is obtained for special purposes. When no hall is provided folding partitions may be used between the classrooms, and so obtain a large hall and at the same time reduce the cost per head. The special advantage of the corridor system is that separate entrances are provided for the rooms. This avoids the objection of having to pass through one classroom to get to another, as is still the case in many old schools. The Staffordshire Education Committee has adopted a plan without a central hall, with open verandas between the classrooms, and a detached or semidetached drill hall to serve all departments. Another type of plan has been adopted by the Derbyshire Education Committee with a high corridor and folding partitions. In both types the classrooms have windows on each side (left and right hand), and are no doubt well lighted and ventilated. A room should be provided for the teachers and for the medical inspection of scholars.

Classrooms.

The number and size of classrooms depends to some extent on the size of the school. No classroom should accommodate more than 60 scholars, but I think a classroom to accommodate from 30 to 50 scholars the best if the question of cost allows it. A good shape for a room is that approaching a square, with the fireplace on an inner wall facing the scholars at one side, either near the door or near the windows; the latter is best, as this would not compel the teacher to stand in the draft between the window and the fireplace. The central part of the wall opposite the scholars should be kept clear for the teacher's use. In my schools the classrooms and central hall floors are invariably formed of solid rift sawn wood blocks, on concrete. A blackboard about 21 in. wide is generally provided round the rooms in upper part of dado for scholars' free-arm drawing, and is made of boards, slate, cement or plaster, painted black, chocolate or dark green. A revolving blackboard appears to be most suitable for the teacher's use, as it may be fixed at various angles and hight, and special matter may be retained on one side while the other side is being used. These are provided in all our new schools. Dual desks are provided for all older scholars, with tables and chairs for the younger infants.

Cloakrooms.

Cloakrooms are placed near the entrances, separate ones being provided for boys, girls and infants. Rails should be at least 4 ft. apart and two tiers high. I think that from 15 to 18 in. should be allowed between the hooks for girls' hats and cloaks, which only means 8 to 9 in. hanging space for each scholar, while 9 in. would be sufficient for boys' caps. The fittings should be of iron coated with enamel or aluminum paint, which keeps very clean. The walls should be faced with glazed brick or tiles to form a dado. The rooms should be well lighted and cross ventilated. Strong wire netting provided in the upper door panels. Doors capable of being locked should be provided to prevent the clothes being stolen by tramps and others. The floor may be formed with terrazzo cement or tiles.

Sanitary Conveniences, Drainage, Etc.

For schools where a public water supply and sewers are available, water closets are provided and are of a modern type. Children old enough to attend school should be capable of pulling the chain to discharge a flushing cistern, and so separate pedestal closets should be provided, and not trough closets. The pedestals should be from 12 in. to 14 in. high, with large water area and a good seal. Closets may be 2 ft. 9 in. wide with a door short at the bottom and at top, and a fanlight over and cross ventilated. The divisions should be 6 ft. high and 3 in. above the floor, and may be of slate slabs with glazed bricks on cement to the walls. Many schools have no public water supply or sewers within a reasonable distance, and so pail closets, such as Moule's earth closets, have to be used. These should be regularly attended to and kept clean. A good sanitary glazed earthenware pail is now on the market, but adds somewhat to the cost. The sanitary arrangements of some of the old non-provided schools in my district were defective and had to be remodeled. Urinals should be lined with impervious materials, such as glazed bricks, cement or slate, with channel along the walls, and a perforated flushing pipe fixed about 3 ft. 6 in. high; slate divisions reaching to the ground are objectionable and difficult to keep clean. The floors should be formed of impervious material with as few joints as possible. Where no sewer is available the urinals and lavatory wastes may be drained into a water tight cesspool. All soil drains are laid on concrete and are well ventilated.

Water Supply.

Many schools have no proper supply of drinking water, and the water has to be collected from roofs or pumped from wells and stored in tanks. Stored water is never satisfactory and is always liable to contamination. Drinking water stored in tanks should be filtered. In some of our schools water has to be stored in tanks taken in public mains in consequence of the irregular supply and to the damage caused by subsidences due to mining.

Warming and Ventilation.

The methods in use for heating are the plain grate of the Leamington bar type, warm air ventilating grates, warm air stoves and low and high pressure hot water. The open fireplace is no doubt cheerful and materially assists ventilation. In old schools I find the grate is set too far back in the wall, and the brickwork set sloping away from the fire. With a heating apparatus fireplaces may be used for special occasions. Where there is no heating apparatus a warm air ventilating grate gives satisfactory results. Warm air ventilating stoves give out a considerable amount of heat, but should be fixed nearly flush with the wall, but they are not so cheerful as open fires. To both the warm air grates and stoves a fresh air supply flue should be joined. Nearly all my new schools are heated by the hot water low pressure system with pipes and radiators; this is less dangerous and more uniform than the high pressure system. Pipes in channels covered with open gratings should not be allowed. A minimum heating surface of 16 ft. per 1000 and 60 degrees F. inside when the temperature is 30 degrees F. outside is always required. Ventilation is probably the most difficult problem not only for schools but for other buildings. For small if not for all schools, the best system appears to me to be the natural system. An extract flue in the chimney stack is useful, but it is not sufficient. An extractor should be provided in the ceilings, carried out through the roof by means of air tight shafts connected to a roof or ridge extractors. The ceiling vent is necessary when no cross ventilation is provided and the ceiling covered, but when windows are provided on both sides, this is not necessary. Inlets may be provided by having a large portion of the windows to open at both top and bottom. The upper portion should be made to open on centers, and the lower part of at least one of the windows fitted with a hopper about 15 to 18 in. high, with passable glazed hopper cheeks, so as to allow the sash to fall on the window board when necessary, and the lower part of the other windows fitted with sashes in boxed frames. Wall inlets with outer gratings and inner regulating louvre inlets may be provided. The outside grating should be built lower than the inside in order to prevent rain, &c., blowing in and to direct an upward air current. I find all window fittings provided with cords troublesome, good rod openers being far more satisfactory.

Lighting.

Every part of the school should be well lighted. Ordinary classrooms are best lighted from the left windows and should be well distributed, with the tops reaching as high as possible. Central halls, if used as an art room, which is often done in higher elementary schools, should have a north aspect. All windows should have clear glass equal to one-fifth to one-sixth of the floor area. Often less than half of this was found in non-provided schools; the minimum amount asked for by county councils was two-thirteenths for old schools. For artificial light gas is used where possible with incandescent burners, or electric light. A large number of schools, however, have to be lighted by oil lamps. The light should be well distributed over the rooms, but kept more to the left hand of the scholars.

Infants are not taught by artificial light, but a light for the cleaner's use is provided. Two and a half to three candle power per scholar appears to me to be a fair amount, but as most, if not all, artificial light burners deteriorate, particularly incandescent mantles, it is advisable to allow a little margin.

The new playhouse to be erected by the Henry C. Miner estate at 156th street and Third avenue, in the Borough of the Bronx, New York, will have a seating capacity of between 1600 and 1800. The plans are being drawn by Architect George Keister, who drew those for the Astor, the Colonial, the Stuyvesant and the Yorkville theatres.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—III.

BY EDWARD H. CRUSSELL.

ALTERATIONS form a large part of the jobbing carpenter's work and frequently involve the cutting of doorways or other openings through existing walls. To do any work of this nature in a brick wall the carpenter must call to his aid the services of bricklayer and plasterer. In a wooden wall, however, as in one of lath and plaster, he can manage alone, it being quite possible to cut an opening through this latter class of wall and not break any more of its surface than can be covered by a 4-in. casing or architrave. Probably, however, the job will be attacked with more confidence the second time than the first. It is this latter job that we intend to explain in the present article.

The first consideration is the size of the opening to be cut in the plaster, and this will depend, of course, upon the outside measurement of the door frame. If we are using a new door and frame we can at once obtain this measurement and commence cutting. This, however, is not always the case. There are generally plenty of second-hand doors to be found around the premises of a jobbing shop and the boss never lets pass an opportunity of using them, or it may happen that the proprietor of the building has an old door that he wishes to utilize, and as it is a little more difficult to make a passable job with an old door than with a new one we shall for our present purpose assume that a second-hand door is the one to be used.

In this case it will be better to give the door an overhauling and put it into shape before commencing upon the wall. The amount of work to be done upon it will depend on the kind of usage the door has received. It may be only necessary to run the plane a few times over the striking edge of the door so as to do away with worn corners, or it may be necessary to go all around the door with both rip saw and plane, making the two stiles of one size and of a parallel width. Cutting off or filling up the old hinge gains because the hinges we have will not fit them, and then squaring up the top and the bottom of the door. If the old lock holes in the door cannot be made to fit the new lock without a lot of trouble, it will probably be better to turn the door around and use what was originally the hinge edge for the striking edge of the door. This is especially so if mortise locks are used. Fitting a new mortise lock into an old hole is one of the most thankless tasks of which the writer has knowledge. The old-time locks were generally much larger than those in use at the present day, and to replace one of these old locks with a new one in a neat and satisfactory manner is a job that calls for not only skill and patience, but a whole lot of luck besides.

In filling up old lock holes it will be better to plug the lock mortise first, and then after reboring the holes for the keyhole and knob spindle fill them with plugs of wood driven in tight and cut off flush. A little liquid glue applied to these plugs is a good thing. Do not cut them so close with the saw as to scratch the surface of the door, for the scratches will show up after the door is painted and the plugs will always be noticeable. Leave a little to be removed with the plane.

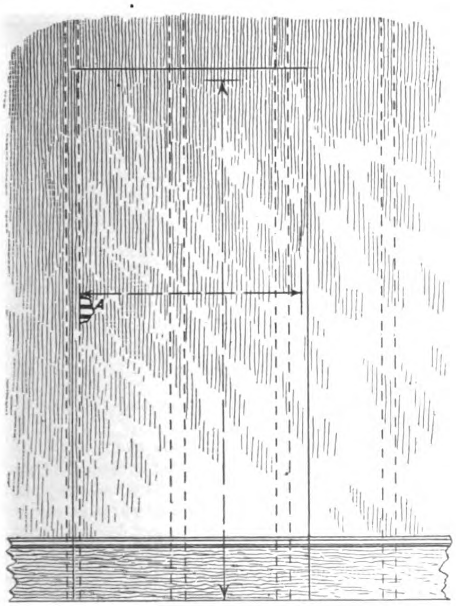


Fig. 13.—Wall of Room Marked for Cutting the Doorway.

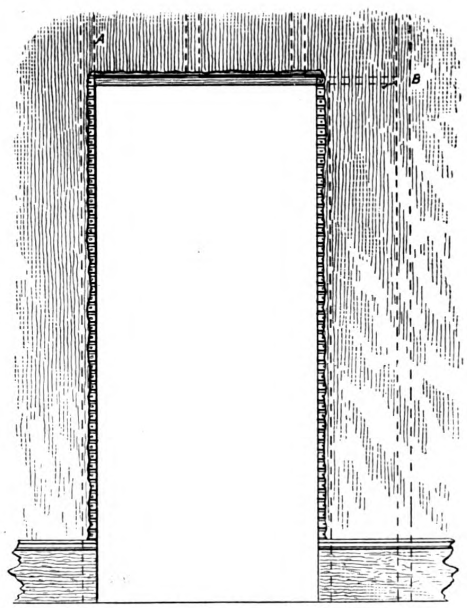


Fig. 14.—The Opening After It Has Been Cut.

The Jobbing Carpenter and Some of His Work.—III.

If there are any holes or other defects in the door so large that they must be covered by an inlay, cut the inlay diamond shaped, lay it in position and scribe around the edges with a fine scratch-awl, mortise carefully to the lines, apply a little liquid glue and drive home tight. The diamond shape is the easiest to fit and the edges of the inlay should be cut a little under square.

It is not necessary to do all of this work before starting to cut through the wall, but it is necessary to mark out the bad portions of the door so as to get the correct size for the opening. Having obtained this measurement and made the door frame to suit we will commence upon the wall.

The ideal situation would be one in which two of the studs came just at the proper distance apart to receive the door frame. This, however, is something not likely to occur, though if we were cutting an archway instead of a door it could be managed by altering the size of the opening a little. Mark the width of the opening on a rod and by the old-fashioned method of tapping the wall with a hammer, proceed to find the nearest stud on one side. Having located it, ascertain the exact position of

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—EDITOR *Carpentry and Building.*

its inside edge—that is, the edge or side against which the door frame will rest, by pushing a scratch awl through the plaster and between the lath; then from this edge mark off the width of the opening. Mark a plumb line on the wall at each side of this width, but about 1 in. further back, and a level line across the top about 2 in. higher than the hight of the door frame. Mark the other side of the wall in the same manner. An inspection of Fig. 13 will make everything clear. At A is shown the spot where the edge of the stud was found by means of the scratch awl. The arrow heads show the outside width and hight of the door frame. The dotted lines show the studding in the wall, while the full lines are the plumb and level lines inclosing the space from which the plastering is to be removed.

Having marked both sides of the wall take a hand axe and, using the point of it, cut through the plastering to the lath all around the opening on these lines. The axe may then be used to remove all the plastering within this outlined space and sliding it along the lath so as to remove the material in small flakes. Use an old bucket or other utensil to catch the plastering as it is taken off, holding the bucket up close to the work with the other hand. This is a much cleaner method than allowing the plastering to fall on the floor and raise clouds of dust. If the building in which the work is being done is occupied the difference between the two methods will be easily noticed and appreciated by the tenant.

Having cleared off all the plaster proceed to cut the lath. Cut only one side of the wall at a time, as in attempting to cut both sides at once will surely push off some of the lath on the far side and probably a yard or

Take now one of the spare pieces of studding, cut it the proper length to fit between the header and the floor, and after removing the "key" of the plastering on the inner sides of the lath insert the stud and nail fast. It should be set perfectly plumb and at the proper distance from stud A to receive the door frame, after which the projecting ends of the lath are nailed to it. The opening as it will now appear is represented in Fig. 14.

It is not the intention of the writer to go minutely into the methods of setting door frames, but mention might be briefly made that, as it is by no means certain the stud marked A will be exactly plumb, the door frame should be nailed to the piece of studding we have just put in, and whatever packing, if any, is necessary should be done between the frame and the stud A. There is also a possibility of the wall not being plumb sideways. If so, the frame should be set to counteract this as much as possible.

It may be that after cutting through the wall we shall find the jambs of the frame are too narrow. If the difference is only ⅛ in. or so it need not be noticed. If it is much more than this, however, it will be necessary to piece out the frame. A neat way of doing this is to work a bead of the proper size on the face of a board, cut it off and nail it to one edge of the jamb. Fig. 15 shows how the bead is made and where it is cut, while Fig. 16 shows

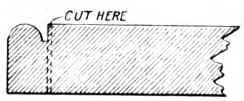


Fig. 15.—Showing How the Bead Is Made.—Scale, One-half Full Size.

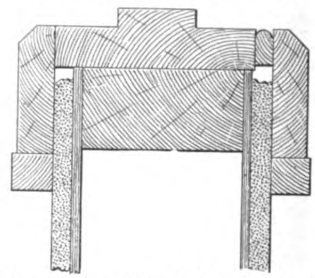


Fig. 16.—Showing How Bead Is Applied to Edge of Jamb.

The Jobbing Carpenter and Some of His Work.—III.

so of plaster with them. Be very careful in cutting the lath on that side of the opening where there is no stud, for it may happen that some of them only reach to the next support, and so will be but short ends after they are cut. Every lath should be held in the fingers of the left hand as it is being cut with the saw, and when cutting the second side where there is room for a longer stroke be very careful to point the saw so that there will be no possibility of hitting the lath on the other side of the wall with it.

It is well to mention that the lath are not cut close back to the plaster, but are cut flush with the edge of the stud on one side and about ¾ in. from the edge of the plaster on the other. It is much easier to cut the opening in the plaster large enough in the first place than to enlarge it afterward, and the projecting edges of the lath enable us to nail them to the new stud that must be put in on that side.

After cutting and taking off the lath cut and remove the baseboards and then cut through the studding at a point 1 in. higher than the hight of the door frame and take them out. Cut out also the piece of studding in the bottom of the opening and fill up the hole in the floor.

Prepare now a piece of 1-in. board as wide as the studding and long enough to reach between the inside edges of the studs marked A and B in Fig. 14. Nail this piece of board as a header in the top of the opening, fastening the ends of the studs that have been cut to it, and the ends of it to the studs A and B. The nailing at B may be accomplished by starting the nails into the board before putting it into position and driving them afterward with the help of a long punch or drift. In the absence of any special appliances for this purpose the nails may be reached and driven with the head of a strong screwdriver. If there is room for it a piece of stud may be used instead of a board, but be careful not to get more space above the door frame than the casing will cover.

it applied to the edge of the jamb and the manner in which the casing covers it.

After the frame is set obtain the exact width of the casings and cut the baseboards back far enough to permit of them being placed in position. The casings supplied us may be the same as those in other parts of the building or they may be only square edged boards. Fig. 16 shows an easy method of relieving the square edged board of a little of its plainness.

As regards the setting of the door frame, we do not intend at this point to give instructions for hanging the door, but would simply remark that the hinges and other trim should be located on the door, not according to your own practice, but to correspond as nearly as possible with the trim in the other parts of the room.

With the door properly hung and the lock fitted, our job of cutting in a doorway is finished. We have endeavored as far as possible to cover every point likely to arise in a job of this kind, and would draw the attention of the young mechanic to the fact that some of the schemes employed, such, for instance, as the piecing out of a door jamb with a bead, were inserted not entirely because of their application here, but as much because they will be useful in other instances of the jobbing carpenter's daily work.

Among the important building improvements for which plans were recently filed with the Bureau of Buildings in the Borough of Manhattan, N. Y., are a six-story apartment house containing 47 suites, to cost $300,000, and to be built at the northwest corner of Broadway and 156th street; a six-story apartment house with 37 suites, to cost $125,000, at the southeast corner of Fort Washington avenue and 179th street; a six-story apartment house with 48 suites, to cost $100,000, and a five-story flat house with accommodations for 25 families, to cost $60,000, at the northwest corner of Audubon avenue and 172d street.

SOME PROBLEMS IN STAIRBUILDING.—VII.

BY MORRIS WILLIAMS.

WE will next explain how to find the form of a section cut through a square block oblique to its axis in two directions. The principle involved in this operation is applied to wreath construction in all cases where the inclination of the two tangents is either the same or different. Referring now to Fig. 41 of the diagrams let *o a b c* represent the plan or base of a square block and the perpendicular lines *b b'* and *c o' c'* the elevation of its sides. Let the oblique line *b' c'* represent the pitch to which the block is cut over and above the plan line *b c*, and the oblique line *b o'* represent the pitch to which the block is cut over and above the plan line *a o*.

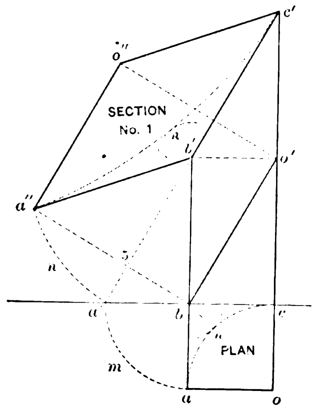


Fig. 41.—Showing Method of Developing a Section Cut Through a Block in Two Directions to Its Axis.

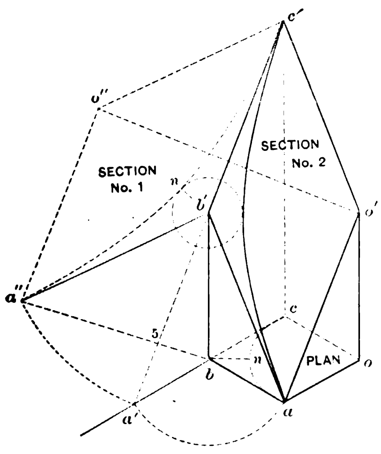


Fig. 42.—A View of the Block Shown in the Previous Figure.

In Fig. 42 similar lines are shown in an oblique view of a solid block having been cut obliquely as described. In this view it is seen that the block is cut obliquely over and above the plan line *b c* equal to the pitch of the line *b' c'* which stands over and above it, and that it is cut to the pitch of the line *a o'* over and above the plan *a o*. It is also cut to the pitch of the line *a b'* over the plan line *a b* and to the pitch *o' c'* over and above the plan line *o c*.

It will be observed that these oblique lines constitute the outlines of the sectional cut made through the block to the pitches indicated. The hand railing problem is to find the form of this sectional cut. How it is done is indicated in Fig. 41. In this figure the pitch line *c' b'* is shown continued to *a'*, and square to it a line is drawn from *b* cutting it in the point 5 and continued indefinitely. The length *b' a'* is then taken in the dividers, and with *b'* as center the line is revolved as shown by the arc *n* to cut the line *b* 5 extended to *a''*. Now by drawing a line from the point *a''* to the point *b'* we shall have found one side of the section. Another side is represented by the line *b' c'*, and to complete the section we need only to draw parallel lines as shown from *a''* to *o''* and from *c'* to *o''*.

To understand the principle involved in this operation a comparison of Figs. 41 and 42 will prove of material assistance. From this comparison it will be discovered that the point *a''* on the section in Fig. 41 represents the point *a* in the plan of Fig. 42; that the point *b'* in the section, Fig. 41, stands over and above the point *b* in Fig. 42; that the point *c'* in the section, Fig. 41, stands over and above the point *c* in Fig. 42, and that the point *o''* in the section, Fig. 41, represents *o'*, which stands over and above the point *o* in Fig. 42, thus clearly indicating that the method employed in Fig. 41 to develop a section cut through a square block oblique to its axis in two directions is correct. The utility of this operation when applied in the construction of wreathed handrails is obvious when considered that a handrail in position above the nosing line of winders around a cylinder travels as we may say upon an oblique plane similar in all respects to these oblique sectional cuts. As an illustration let a quarter circle curve be described from *o* as a center upon the plan of the square block in Fig. 41 from *a* to *c*. This curve will represent the plan center line of a wreathed handrail.

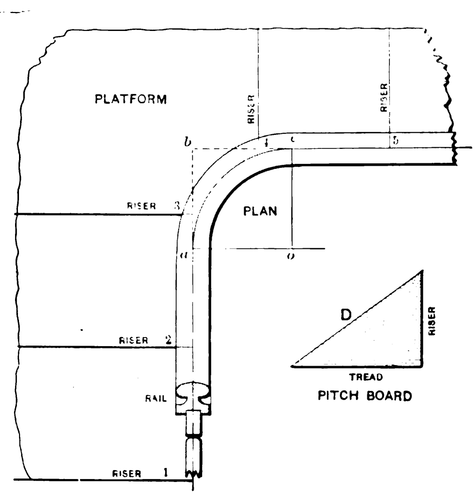


Fig. 43.—Plan of Stairway Having a Quarter Turn Cylinder Between Two Flights.

Some Problems in Stairbuilding.—VI.

To find the center line of wreath that will stand over and above the plan curve while extending from the point *a* to the hight shown above the point *c* in both figures, is only a matter of transferring the curved line from the plan to the section already found. To perform the operation make *b' n* on the section equal to *b n* on the plan and trace the curve of the center line of the wreath on the section from *a''* through *n* to *c'*. The method usually in practice to trace the curve is to bend a lath to touch the points *a'' n c'*. A view of this curve as shown on section No. 2 in Fig. 42 standing over and above the quarter plan curve, so clearly exhibits the operation as well as its utility in constructing wreathed rails as to require no extended explanation.

We will now apply these methods of operation to a practical case of a handrail to stand over a quarter turn cylinder between two flights as indicated in the plan view, Fig. 43. The quarter turn cylinder as shown contains risers 3 and 4. In this diagram D shows the pitch board for the two flights.

To find the exact hight the wreath is to rise from the point *a* to the point *c* over the plan in Fig. 43 it will be necessary to draw an elevation of the steps, or rather of the risers 3 and 4, which are within the quarter turn curve of the cylinder.

The operation is illustrated in Fig. 44, where the plan quarter turn curve of the center line of the wreath is shown drawn from point *o* as center. Place the dividers in *b*, extend to 3 and turn over to *m*. Again from the same center *b*, turn over the point *a* to *a'*. Upon *m* erect the line *m* 3' equal in hight to one riser, and upon 4 erect the line 4 4' equal in hight to two risers. Now connect 4' and 3' extended in both directions toward *a''* and *c'*. Draw a horizontal line from *a''* to *o'*, and the distance from *o'* to *c'* will indicate the total hight the wreath rises from the lowest point *a* to the highest point *c* of the cylinder shown in both of the plans, Figs. 43 and 44. By comparing Fig. 44 as now constructed with

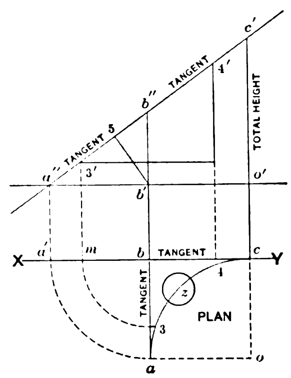


Fig. 44.—Diagram Showing Elevation of Tangents Over the Cylinder.

ends *a''* and *c'* about ¼ in. wider and trace the inside and outside curves of the mold as shown.

In Fig. 46 is shown the bevel to twist the wreath, which is found by making *a b* equal to the plan line *a b* of Fig. 44, and *b* 5 equal to *b'* 5 of Fig. 44. Only one bevel is required for both ends, because the two tangents as shown in Fig. 44 are equally inclined.

In Fig. 47 is shown how the bevels are applied, that at the end *a''* being turned toward the inside of the wreath, while that at the end *c'* is turned toward the outside. The method of applying the bevel is to hold the stock parallel with the joint, square to the tangents; and the blade to cut the center point of the plank.

In addition to the method of drawing the curves of the face mold by means of level lines or "ordinates" as was used in the preceding examples, stairbuilders also make use of a straight edge, string and pins and the trammel, which is sometimes called the "elliptic compasses." How to use the straight edge is indicated in Fig. 48. The pitch line 6 4 in the diagram defines the oblique angle to which a semicylinder is cut in one direction to its axis. If we consider the three semicircular curves of the plan in this figure to represent the inside, outside and center lines of a handrail, then the three semielliptical curves above and shown upon the sectional cut 6 4 will be the development of them; in other words, will be the face mold for a wreath that is to stand over

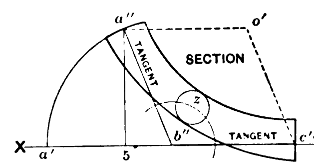


Fig. 45.—Face Mold.

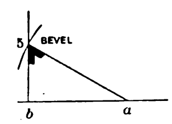


Fig. 46.—Bevel to Twist the Wreath.

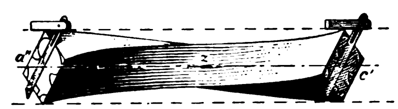


Fig. 47.—Showing How the Bevels Are Applied.

Some Problems in Stairbuilding.—VI.

Figs. 41 and 42 it will be observed that the plans containing the quarter turn and the tangents *a b* and *b c* in the three figures are similar; also that the pitch line *a'' b'' c'* of Fig. 44 is relatively identical with the pitch line *a' b' c'* in Figs. 41 and 42; that is, it shows an equally inclined pitch over the plan tangents *a b* and *b c*.

Now draw a line from *b'* in Fig. 44 square to the pitch line *a'' b'' c'* to 5. This line also is shown in Figs. 41 and 42 from *b* through 5 and extended to *a''*. In these latter figures is shown the use made of it, which is to develop the form of a sectional cut made through a square prism or block.

Referring to Fig. 45, we show how the face mold is constructed by the same operation. Draw the line X Y and transfer to it from the pitch line of Fig. 44 the points *a''* 5 *b''* *c*. Note that the line X Y in this figure represents the pitch line in the other figures. Upon 5 erect the line 5 *a''* square to X Y. Why this line is drawn square to X Y is shown in Fig. 41. Place the dividers in *b''*, extend to *a'* and turn over as shown to *a''*; then connect *a''* with *b''*. Draw *c' o'* parallel to *a'' b''* and *o' a''* parallel to *b'' c'*, thus completing the form of the section by exactly the same operation as shown in Fig. 41 to develop a sectional cut made obliquely through a square block.

In Fig. 45 the line *b'' a''* will be the lower tangent of the face mold and the line *b'' c'* the upper tangent. The angle at *b''* defines the angle between the tangents as required upon the face mold to square the joints.

Measure from *b''* to *z* a distance equal to *b z* on the plan, Fig. 44. The line *b'' z* in this figure corresponds to the line *b n* in Figs. 41 and 42. Draw the circle to represent the width of the rail. Make the width at the

and above the plan curves, while resting upon an inclined plane equal in pitch to the line shown from 6 to 4.

How to draw the elliptical curves by the use of a straight edge is indicated in the diagram. From 3 of the plan draw the line 3 *o'* to cut the pitch line 6 4 in O' precisely in its center, then *o'* will be the center of the three ellipses. From *o'* draw a line square to the pitch line 6 4, and mark upon it the distances 1', 2', 3', taken from the plan as there shown from *o* to 1, 2, 3. The distance from *o'* to 1 will be the length of the semiminor axis for the inside elliptical curve; from *o'* to 2 that for the center curve, and from *o'* to 3 that for the outside curve. Likewise the distances from *o'* to *n m* 4 will be the semimajor axis for the same curves. Now to draw the curves with the straight edge; first mark upon it as shown from *o''* to 3'' a distance equal to the semiminor axis *o'* 3; also from *o''* to 4' a distance equal to *o'* 4, the semimajor axis. Now place the straight edge as shown with the point 3'' on the major and point 4' on the minor axis, and with a pencil as shown at *o''* make a dot. Change the position of the straight edge and mark another dot, but always be careful to keep the point 3'' on the major axis, and point 4' on the minor axis. Any number of dots may be marked in this manner, all of which will be contained in the elliptical curve, and by tracing through the dots the curve will be completed. In drawing the inside curve the semiminor and semimajor axis of the inside curve will be marked on the straight edge, but the operation will be the same.

In Fig. 49 we show the method of drawing an ellipse with the string and pins. The plan in this diagram shows a circle inscribed within a square assumed to represent the base of a cylinder. The pitch line *b' d'* indicates the sectional cut made through the side in one direction to its axis. Through the center *o* of the plan draw the line 1 *c*, continue to *c'*. From *c'* draw the minor axis square to the pitch line *b' d'*, making it equal in length to the diameter 1 *c* of the plan. Bisect it in *o'* and through *o'* draw the major axis square to the minor axis, making its length equal to the pitch line *b' d'* as shown from *a'* to *e'*.

Now take on the compasses the distance *o' e'* or *o' a'*, which is half the major axis, and fixing one leg in the point 1' where the pencil is shown, extend the other to cut the major axis in 2 and 2. Now place pins in the points 2 and 2 and tie a string to them, extend the string to 1', fix a pencil to it as shown and sweep the elliptical curve around from *a'* to *e'*. This last method is the one most generally employed by stairbuilders.

It will be observed that both methods are very simple of execution once the length of the major and minor axes is known. How to find them for the curves of the face mold will be explained when drawing the face molds for future examples of wreath rails.

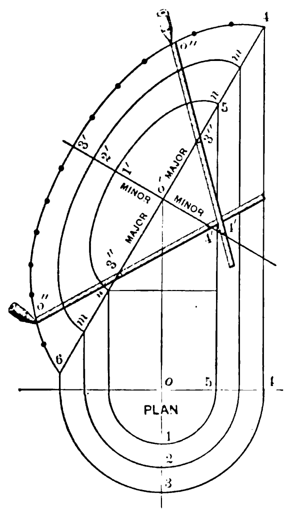


Fig. 48.—Showing How to Use the Straight-Edge to Draw Elliptical Curves.

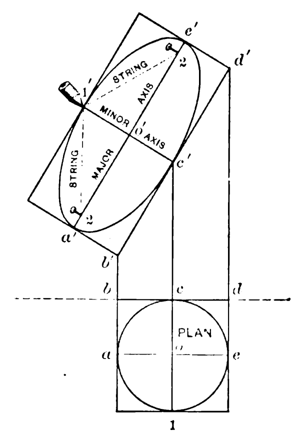


Fig. 49.—Drawing an Ellipse with String and Pins.

Some Problems in Stairbuilding.—VI.

In many cases as in Fig. 45 the face mold may be drawn without reference to the axis by merely finding three points contained in the curves and bending a lath to touch them for the inside and outside curves. In cases where level lines or "ordinates" are manipulated the axis may also be dispensed with, but in all cases where the curves are abrupt, that is, of small curvature, it is advisable to use either of the two methods illustrated in Figs. 48 and 49.

Cleaning Hard Pressed Brick.

In describing the process by which hard pressed brick that has been discolored by water running over it from galvanized iron roof gutters can be cleaned, a writer in a recent issue of *The Painters' Magazine* offers the following suggestions: Mix with ½ gal. of soft soap 2 lb. ordinary pumice stone F or O and ½ pint 18 degree ammonia, stir thoroughly and apply to the stained brick, let the solution stay on for about 30 min., then with an ordinary scrubbing brush rub it briskly, then wash off with clear water, using a large sponge. If this does not remove the stain, then make a paste by dissolving 2 oz. oxalic acid in 1 quart of hot water, add 1 oz. butter of antimony (antimony trichloride) and mix with it enough flour to make a paste, which apply with a brush like a stout paint, let it remain at least two days, then wash off. The discoloration is, no doubt, due to rust.

Lampblack in oil, that has become dry, may be taken out of brick by slaking 3 parts by weight of quicklime in water and adding to the slaked lime 1 part by weight of pearl ash or soda ash, making the mass the consistency of soft paste. Put this on the lampblack with a common fiber brush and let it remain for about 12 hr., then scrape and wash with clear water.

Increase in Cut of Government Timber.

The forests of the United States yielded an increase of 102 per cent. in timber last year over the record for 1907. The amount of timber cut from all the national forests was 392,792,000 ft. board measure, as against 194,872,000 ft. in the previous year. This figure for 1908 does not include the 131,482,000 ft. given away to settlers, schools and churches under "free use" permits. This increase of 102 per cent. shows a far better use and increasing productiveness of the forest under conservative methods of cutting. There was a marked increase in small sales last year, resulting in an increase of 236 per cent. in the number of sales, notwithstanding the fact that the timber contracted for was far less in the aggregate than in 1907.

In making timber sales the Forest Service seeks small in preference to large sales, and aims to safeguard a supply for future needs rather than to swell the immediate receipts. Were it desired, the present receipts from timber sales could be quickly doubled. During the year it was found necessary in the interest of a continued supply to restrict sales on many forests. Nevertheless, use of the national forests as a source of timber supply was more general than ever before.

Payment for timber is always required in advance. In large sales, however, and in small sales on occasion, payment is made in installments so arranged as to protect the Government against loss without imposing unnecessarily severe burdens upon the purchaser. Thus the receipts of each year represent substantially, but not exactly, the value of the timber sold and removed during that year.

A Large Cottonwood Log.

The largest cottonwood log ever cut in the South is said to have come from Lula, Miss. The log is 7 ft. in diameter and 12 ft. long, and will cut 4800 ft. of lumber. The log was so big that it had to be split with dynamite, as no mill in Memphis had the capacity to cut it. Cottonwood trees are said to grow more rapidly than any other kind of trees in the country. Their average growth is about ¼ in. a year. Therefore the tree from which this log was cut is believed to be 336 years old.

SYSTEM IN THE EXECUTION OF BUILDING CONTRACTS.*—II.

BY ARTHUR W. JOSLIN.

UPON visiting the job it is a good plan to go from top to bottom of the building, taking notice of everything that is going on, whether being done by your own men, your subcontractors or the owners' subcontractors. Also look at the stock piles to see that materials are being delivered fast enough so that there is no danger of shortage occurring, necessitating the laying off of help.

Having "taken in" everything about the work, now look up the foreman and give him your orders. If you have seen anything in your rounds of the work that is not going just right call his attention to it, letting him know what you want done and if it is something concerning the way men are doing some piece of work let him take it up with the men himself. By permitting the foreman to make all corrections with the help he can maintain a proper discipline on the work. Of course, there are cases when you will see something being done so radically wrong that stock is being spoilt or wasted rapidly, or the men's lives or limbs are being endangered, and in such cases you should either correct things at once or stop all work, get the foreman and with him straighten the matter out. Storming around and hollering to the help confuses them, and calling the foreman down before the help makes him small in his own and the help's eyes. If the foreman needs censure take him to one side and give it to him; never allow yourself to do so in the presence of the help, owner or architect if you can possibly avoid it.

Go Over the Job with Foreman.

Having given the foreman time to straighten out any little matters you have seen that need immediate attention, I would then go over the job with him, pointing out the parts of the work that you want pushed faster or that you want taken up next, suggesting (or ordering if you see fit) that this or that thing be done next, or in a certain way; that certain shifts be made in the help; that this or that stock be used next, or for a particular purpose. Give him directions or orders for the subcontractors under your control, and any other orders, directions or suggestions that may seem to you to be necessary for the proper conduct and progress of the work. Then ask him if there is any stock wanted, or will be wanted in a few days, which should be ordered at once. Remember that two heads are better than one, even if one of them is the foreman's. You may have thought that you saw everything, but he will undoubtedly call your attention to a number of little things wanted that escaped you altogether, that are just as necessary and important as the big things, if the work is to run smoothly and logically.

The writer frequently finds it necessary to tell the foreman to erect some particular part, or do some certain thing, at once, or within the next few days, the doing of which seems illogical to him. In this case it is probably because we want certain parts erected so that we, or a subcontractor, may make measurements for something that has to be gotten out or made to order, and we have mapped out in our own mind about when this particular stock will be wanted, and knowing about how long it will take to get it out and deliver it, know best when the work that makes it possible to get measurements should be done. It is just as well to let the foreman know why you want work of this kind done and impress upon him the absolute necessity of its being done on or before a certain time. No one likes to do work that seems illogical, and the foreman will see the logic and necessity of the matter when explanations are made and will accomplish the results you desire with more spirit and dispatch.

You may think these latter suggestions somewhat unnecessary, but we have seen many jobs delayed because nobody gave any attention to matters that required something to be done so that measurements of special material could be obtained, until the work was practically ready for these materials, and then there would be a shifting or laying off of help and a wait of days, or even weeks, for this particular stock.

These delays may be almost or wholly obliterated if you study your plans and specifications sufficiently, running the job from them rather than from the building itself. It is only by determining the wants of your job from the plans and by having scheduled the times at which certain things will be wanted, that you can avoid vexatious delays, assuming, of course, that you get drawings and details from the architect fast enough, and we will go on record as saying that in nine cases out of ten it is your own fault if you do not.

The foreman will probably want decisions as to the exact meaning of the plans and specifications, especially in parts of them where they are a trifle vague or susceptible of a double interpretation. These matters should be gone over with the foreman carefully and a ruling and definite instructions given him by you, unless it appears to be something that should be referred to the architect for a decision. In the latter case the matter should be referred to the architect at once, and by letter if possible, and his instructions or interpretations be obtained and followed unless there is some *very* good reasons for disagreeing with him. In this case have the matter out with him, and after coming to an agreement give orders or directions to the foreman. All these things being looked after, it is time to move on to another job or the office and take up the matters concerning this and other jobs.

Assuming that we are back to the office again, there will be the materials to order that you and the foreman have determined are wanted. The telephone and letters soon take care of this and get them off your mind. Then there are details that are wanted, and you take the matter up with the architect by letter. You also noticed that some of the subcontractors wanted a little pushing, or some information that you have obtained, and you next get these things off your mind by attending to them.

All details for the job should be sent to the office, not to the building. Upon receiving a detail look it over carefully; first to see that it conforms to the general plans, large scale drawings that may have been a part of the contract plan and the specifications; second, to see that the work illustrated by the drawings is so laid out as to be practicable and make a good workmanlike job and will fit into the structure under the existing circumstances, as is intended by the architect; third, to thoroughly familiarize yourself with the detail and all that it is intended to communicate to you, so that you can explain its meaning fully to the foreman and any of the subcontractors whose work may be illustrated therein.

Consult the Architect.

If in looking over the detail you see anything about it that is not clear or will not work out right or make a first-class job, or that you think is in excess of your contract plans and specifications, go to the architect at once or at the very first opportunity, taking the drawing with you, and discuss the whole matter with him and mutually agree upon everything before leaving. If this necessitates corrections or changes in the drawings have them made by the architect. You can then take the drawing back to the office knowing what it all means, and you are ready to distribute and correctly explain the information it contains to all parties concerned without further delay. Adopting this course will save you from the possibility of giving wrong explanations and later misunderstandings with the architect and others.

Having now agreed with the architect in regard to the detail it should be absolutely and faithfully followed, even though you may not see the sense and logic of it all. The architect probably sees it, and if the matters fall within your contract it is none of your business unless he chooses to explain.

Now, if there are parts of the detail relating to several of the subcontractors' and to some of your own work, you should make sufficient copies to give each party con-

* Copyrighted, 1908, by Arthur W. Joslin.

cerned a drawing and have one left for the office, so that the original can go to the job to be kept there; or better and easier still, trace from the detail only that part which concerns each particular branch of the work, with enough of the adjoining parts of other work in each case to make the copy clear as to the location of the work, and give to each subcontractor or material man the copy intended for him. Make a complete copy for the office unless you are fully satisfied that after the thorough study you have given the detail you will not need it in the office, and send the original to the job to be kept there at all times for the guidance of the foreman and all others concerned.

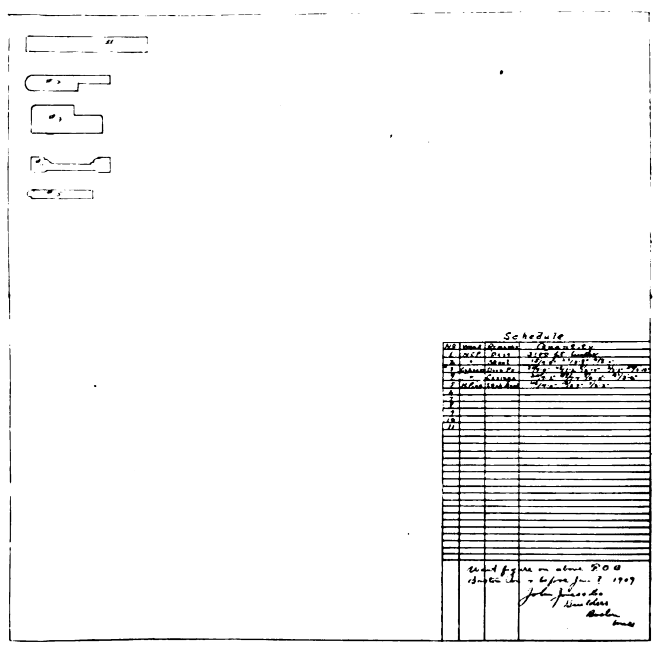
To illustrate the point clearly, let us assume a detail through the outside wall and a window in a brick building, beginning just below the first floor level and extending above the second floor. This drawing would show in section and broken elevations drawn to full size the following parts of the structure; stone or terra cotta water table or belt course; stone or terra cotta sill and lintel of window; second story belt or cornice of stone or other material, if there happens to be one; the window frame and sash, with sections of the sill, jamb, mullion, head, sash, stop beads, edge casings, casings, stool and apron; the base and molding; chair rail; picture molding; the steel beam or other lintels over windows back of stone work; the size of the brick, with thickness of mortar joints and elevation of the bond; and even other parts not mentioned. But these are sufficient for illustration.

Now proceeding according to the second plan outlined we would take a piece of tracing paper of sufficient size to get off all that concerns the stone or terra cotta trimmings; trace the section water table or first story belt, showing the brick above and below it for a couple of inches; then trace the section of stone sill and lintel, showing an inch or two of the brick lines and enough of the window frame sill and head to show the connection between the parts. Next trace the section of the second story belt or cornice, also showing line of brick above and below, and make elevations of any parts necessary to fully illustrate the work shown in section, such, for instance, as the corner of sill showing raised lug, &c. Only a small part of the drawing as a whole has now been copied, but you have everything on this drawing that the cut stone man wants, and you can turn it over to him. In the same way trace section of iron lintels for the steel man, window frame and sash for the sash man, and "finish" for the finish man.

In case you are going to make a schedule of finish yourself to take figures on later, when you have all the details concerning it, take a piece of paper about 3 ft. 6 in. square, place one corner over a pattern of molding, trace and number it No. 1. Next take another molding, numbering it No. 2, and so on, until you have traced, one under the other, each different pattern of molding. Now make a schedule of numbers down in the lower right hand corner, allowing room to increase the size of the schedule later, and in a place for remarks note the purpose of the molding and kind of wood. A good idea may be gained from the diagram shown herewith.

Having gotten all the moldings in this detail file the tracing away in the plan drawer for this job, to be taken out a little later when the next detail showing finish comes along and other patterns are to be copied onto it. This method, as can readily be seen, takes a little time, but the labor is well spent and will save the time it has taken 10 times over before the end of the job. All the subcontractors have the information they want as far as it goes; you have a copy of members of finish as far as detailed and you have the original for the job, where it belongs. These copies will all serve to save you telephoning and explaining, bothering the foreman and thus interfering with your work; saves the architect's time and patience in explaining things that you should explain; overcomes the possibility and probability of misunderstandings and consequent mistakes, while greatly facilitates the getting out of the several materials and parts. You must admit that all of these benefits compensate for the trouble and time involved in making the copies.

(To be continued.)



Typical Sheet of Moldings, Scheduled by Taking Tracings of Members as They Occur on the Details.—One-tenth Full Size.

System in the Execution of Building Contracts.

Moving a Five-Story Brick Building.

The moving of a five-story brick flat house from one site to another 200 ft. away has involved some interesting problems for a firm of Brooklyn contractors. The city is extending one of its avenues and the property upon which the building stood was condemned to make way for the improvement. In doing the work the brick walls on all four sides were pierced and through these openings wooden beams were run entirely through the house. After the timbers were in place the building was raised about 3 ft. from the ground by means of 320 jack screws, each capable of lifting 6 tons. After the structure was raised from the ground 350 wooden rollers were placed underneath the timbers and so arranged that the house rested practically upon a big turn table. In moving the building forward 4-ft. jack screws were used, each turn of the screws moving the building forward ¼ in. The work is being done by Miller Daybill & Co. of Brooklyn, and it is estimated that about a month will have elapsed by the time the building is properly placed upon its new site.

ONE of the latest improvements contemplated for Cathedral Parkway, in New York City, is a 10-story apartment house having a frontage of 95 ft. and a depth of 115 ft., and to cost $580.000. It will be constructed of brick, finished with limestone and terra cotta, and will be of Renaissance style of architecture. The designs have been prepared by architects Neville & Bagge of New York City.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - TREASURER
GEO. W. COPE, - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

APRIL, 1909.

A New-Law Tenement House.

The recent filing of plans for the first seven-story tenement house projected for erection in Greater New York since the tenement house law went into effect in 1901 directs attention to an important difference between the old and the new building ordinance. Under the old law it was permissible to erect seven-story nonfireproof tenement houses, but the new law restricted the hight of nonfireproof flat houses to six stories. According to experts the latter style of structure could be built for a much smaller sum and had a greater earning power in proportion to its cost than the seven-story fireproof house. As a consequence the six-story nonfireproof flat house became the popular type of house with speculative builders. The new seven-story fireproof tenement house for which plans were filed by Architects Janes & Leo will be of brick with stone trimmings, and will have a frontage of 75 ft. on Thompson street. There will be 10 suites of rooms to each floor with the exception of the first story, which will contain six suites with ground floor stores. There will also be stores in the basement. The estimated cost of the improvement is placed at $70,000.

Commercial Side of Industrial Training.

A wide difference is found in the practice of industrial schools in the development in the pupils of the utilitarian spirit which comes with a comprehension of the commercial side of their work. Naturally, the training of the workrooms is in itself essentially practical, but it sometimes lacks the element which deals with costs and profits. An idea worthy of a broad adaptation lies in the recommendation of the Director of Drawing of the Public Schools of Providence, R. I., that the work of students be placed on sale. He cites the success of the practice in Fitchburg, Mass., where a ready market for the work was found. A common complaint on the part of employers of young men who have been educated in technical schools of the various grades is that as new employees they have plenty of theory, but too little of its practical application. Occasionally these complaints are extreme, their makers failing to realize the impossibility of proportioning the two elements, so that the criticism would be avoided and time left for training in the fundamentals of their work. Where the work of pupils is so planned that there is a market for some of it, the object lesson to the boy may be a very striking one and may possibly leave a permanent, vital impression upon his mind. Presuming, for example, that he has kept his time for a job, and can compare it with the money received for the product, he may experience some discouragement in the small return per hour of his labor, to say nothing of materials and overhead charges. Yet it would demonstrate forcibly the need of arranging production, so that its cost will be far enough within the market price to leave a fair margin of profit. Ignorance of costs is an influence worth considering in the relations of employer and employee. The average workman has small conception of the cost of the product of his labor. He figures within the narrow limits of labor and material, neglecting the great factor of general expense, of which he has small knowledge. According to his reckoning the employer's profits are far beyond reality, and from these fictitious figures he argues the ability to pay him higher wages.

Tasks Allotted to Pupils.

The commercial idea in connection with the schools is by no means a new one, but some of the educators who specialize in this branch of pedagogy do not go along rapidly in the adaptation of the plan to the needs of their pupils. In some schools the tasks allotted to the boys are designed with little regard for their actual usefulness. They afford the necessary practice to demonstrate the use of tools, machines and the kinds of materials, but when the work is finished it is worthless except for show purposes. A certain amount of this is probably necessary, but it would not be a difficult or arduous task, seemingly, to plan the work along more practically useful lines and get just as advantageous results in the way of training, and at the same time give the young workman the incentive of knowing that the products of his hands and brain are to be sold in the market and put to use by some one. The business instinct is usually present in the mind of the young American, but in some boys it is almost entirely latent and needs early cultivation to start it along so that it will reach a normal growth. The development of this faculty is essential if a boy grown to manhood is to fill an administrative or creative position of importance in the industrial world. It is not to be understood that industrial training should be entirely subservient to commercialism in its most concrete form, but rather that the commercial side should be kept always in mind, instead of making the predominating influence the striving of instructors and students after exhibition pieces with which to fill show cabinets that visitors may be impressed. If the work of students is designed so that it will meet with the approval of practical men who have given thought to the subject, there will be little danger of lapsing into the desire for prettiness in place of practical benefits.

Modern Bathroom and Kitchen Equipment.

A modern house bathroom in a dry goods store may seem somewhat unusual, but there has been one on exhibition in New York City for a number of months in connection with the complete furnishings of a modern house. This exhibit includes among the numerous rooms a completely fitted bathroom and kitchen and butler's pantry. The bathroom is more than an ordinary bathroom. It is a room of large dimensions, accommodating with ease a bathtub, shower, lavatory, bidet scales and several chairs or stools. It is also equipped with a full line of accessories, such as towel bars, glass shelves, mirrors, towel baskets and the like. Situated as it is it attracts the eye of hundreds of householders who pass through the exhibit daily, and is certainly an effective way of introducing plumbing supplies to many people difficult to reach in any other manner. The kitchen likewise is of modern equipment, containing an 8-ft. range with broiler, a marble top pastry table with basins and dishes on glass

SHINGLED STABLE OF MR. JOSEPH MORRELL ON GLEN RIDGE ROAD, DEDHAM, MASS.

CHAPMAN & FRAZER, ARCHITECTS

Supplement Carpentry and Building, April, 1906

shelves in the rear, another table containing a full equipment of copper cooking utensils, while there is a solid porcelain dish sink and also a vegetable sink of the same material. The ice box in the same room is of tile with heavy wire shelves throughout. The butler's pantry contains a large porcelain sink.

A Shingled Stable at Dedham, Mass.

(With Supplemental Plate.)

We have taken for the subject of our half-tone supplemental plate this month an attractive stable of shingled exterior, and containing on the main floor two stalls for horses with carriage room so disposed that it can be used to store the owner's "auto" or runabout, a glimpse of which is caught through the front door, shown in the picture partially open. The room is also fitted with a work bench for repair purposes, this being one of the inevitable accompaniments of ownership of a vehicle of the sort indicated.

The stable here shown is that of Mr. Joseph Morrell and is located on Glenridge Road, Dedham, Mass. The drawings were prepared by Chapman & Frazer, architects, 8 Exchange place, Boston, Mass.

Massachusetts Society of Brick and Stone Masons—Masters and Craftsmen.

The annual meeting of the Massachusetts Society of Brick and Stone Masons—Masters and Craftsmen, was held in Boston on January 12, and was a most satisfactory gathering. The membership of the society is rapidly increasing, and during the month immediately preceding the meeting more than 75 were added to the rolls. The division which has been made in the membership of Craftsmen and Associate Members is proving a most valuable feature, enabling workmen to be taken into the society who are not yet equal to being considered full Craftsmen, but who need the encouragement and standing which membership establishes. The society "advanced" a number of Associate Members to the Craftsmen's degree during the month preceding the annual meeting, these members having demonstrated their fitness for advancement, which is a very hopeful and wholesome sign.

At the annual meeting the schedule of wages and working rules for 1909 was adopted in an orderly and businesslike way, evidencing a complete comprehension of the value of the new method. The following are the conditions to govern the employment of bricklayers and stone masons during the ensuing year as determined at the annual meeting in question:

HOURS.

Regular hours of labor on work within the territory of Greater Boston will be from 8 o'clock in the morning to 5 o'clock in the afternoon, with interval of an hour at noon. During the winter, when darkness prevents working up to 5 o'clock, the noon interval may be shortened, so that full time may be worked. On Saturdays during June, July and August, regular hours will be from 8 o'clock in the morning to 12 o'clock noon.

Work done outside "regular hours" by the same men who are working "regular hours" on the job will be reckoned as "time and a half," but work done by other men outside "regular hours" will be reckoned as single time only.

Work done on Sundays or legal holidays will be reckoned as "double time."

WAGES.

Wages will be as agreed with the individuals employed, and will depend upon skill and efficiency, it being understood that first-class workmen will be entitled to receive 60 cents per hour, and that men admitted as "Craftsmen" in this society are considered first-class workmen.

Wages will be paid weekly, and not later than before quitting time on Saturday.

If a workman be discharged, he will be entitled to receive his wages in full on the spot, in cash. If this be not done, he will be furnished with an order on the office for the amount due, and will be allowed and paid for sufficient time to enable him to reach the office, in no event less than 1 hr.

If a workman quits work voluntarily he will not be entitled to receive his wages until regular pay day.

Workmen engaged and reporting for service at appointed time, with proper and sufficient tools, if not set at work will be entitled to one hour's pay, unless the state of the weather or other conditions prevent work being done.

All work is to be conducted under "open shop" principles.

In this connection it may not perhaps be without interest to give a few particulars relative to the history of the society as they appeared in the February section of *The Master Builder*, a year book issued in monthly sections in the interest of the building fraternity throughout the United States by the Master Builders' Association of Boston.

Several years ago the suggestion was made that an alliance of employers and skilled workmen might be advisable, the purpose of which should be to bring skilled wage workers and their employers together in such fashion that the friction under the conditions created by modern trades unionism might be avoided.

While the suggestion met with a certain amount of approval among employers in the trade in which the idea originated (bricklaying and other masonry), no actual progress along this line of action was made until 1907. Early in that year it was evident that some of the more independent workmen, becoming restive under the conditions existing in their union, were questioning whether the suggestion of an alliance was really feasible. Conferences followed between these workmen and those employers who were conducting their work under open shop principles, and finally, at a general meeting of journeymen bricklayers and employers in that trade, held on June 24, 1907, it was decided to organize upon the basis proposed, namely, the joining of employers and workmen in one common society.

On July 1, 1907, the meeting for organization was held, constitution and by-laws were adopted, and board of governors elected. The name determined upon was "The Massachusetts Society of Brick and Stone Masons, Masters and Craftsmen," a title descriptive of the new departure. Under this title a charter was taken out, under Massachusetts laws, on July 8, 1907, this being the first trade union ever incorporated in Massachusetts, and the first organization combining masters and craftsmen ever incorporated in the United States and possibly in the world.

Michigan State Association of Builders.

The annual convention of the Michigan State Association of Builders was held at Grand Rapids, Mich., February 17 and 18, under most encouraging auspices. Great interest was manifested in the discussions which ensued, the reports which were presented and the address of President Edwin Owen, who declared that it was better for both employer and employee to be organized that neither may be oppressive to the other.

In his annual report Secretary J. J. Whirl of Detroit showed that while the past year had been one of depression, the building trade suffered no great disasters and in general was a year of harmony.

The election of officers for the ensuing year resulted as follows:

President	Edwin Owen, Grand Rapids.
Vice-Presidents	John M. Fernor, Ann Arbor; J. P. Miller, Bay City; Moor McQuigg, Kalamazoo.
Treasurer	A. A. Albrecht, Detroit.
Secretary	John J. Whirl, Detroit.

At the present time the association has about 300 names on the membership rolls, which is an increase over last year. At the convention "equal rights for all; special privileges for none," were the sentiments expressed. The freedom of labor was insisted upon and the principle of open shop was proclaimed.

The next convention of the association will be held in Bay City.

PLANS have recently been filed for a 10-story warehouse to cost $125,000 and to occupy an irregular plot at Nos. 139 and 141 Franklin street, Borough of Manhattan, N. Y.

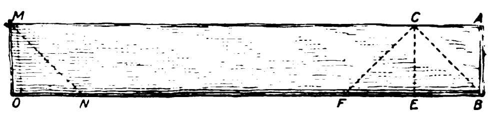
CORRESPONDENCE.

Building a Mothproof Room.

From F. D. J., Brooklyn, N. Y.—The writer has just completed a country house, and would like to know how to build a "mothproof" room without using moth balls, camphor or going to the expense of red cedar wood. The room is about 6 x 10 ft. under a slanting roof, with a window about 2 x 2 ft. 6 in. on one side.

"Brailing Up" a Flag.

From Reader, Kingsbridge, New York City.—Allow me in as few words as possible to answer the inquiry of "F. M. G." in a recent issue anent "brailing up" a flag. Fold the ensign or standard parallel to its length twice, or three times if the flag be large. The proportions of a flag being 5:3, the folding flag will be as 20:3, or seven times larger than the folds. Take the edge furthest from the field, as shown in the sketch at A B and fold it on the line C B, so that a A B coincides with E B. Fold along the line C E so that C B falls along C F. Fold thus until the flag finally is folded into a triangle as M N.



Showing How to "Brail Up" a Flag.

Take care that alternate folds are on opposite sides of the flag in order to shake out more easily. The standard or flag being folded as shown in M N O, make fast the peak halyard to the loop sewn along the blue field and make the lower halyard fast to the remaining loop. Now loop the lower halyard and form it in two strands and pass around the folded flag and tie in a "granny" or false knot. Some usually slip the bight under the double strand in fair weather only. The flag as furled or folded and made secure can be run up the mast, and at a given signal be shaken out to the breeze by a strong pull on the lower halyard.

If this explanation seems confusing to "F. M. G." I would advise him to practice "brailing up" for an hour or so and he will find no further difficulty in fully comprehending the operation.

Laying Out Hand Rails by Sectorian System.

From D. M. R., Michigan.—I am interested in the subject of stairbuilding and come to the Correspondence columns for information as to the proper method of laying out a hand rail by the Sectorian System invented by William Forbes. Apropos of the attention which is just now being given to the general subject of stairbuilding possibly some of the experts may be willing to furnish something on this phase of hand railing.

Locating Points for Getting Treads and Risers in Stairbuilding.

From G. W. B., Hampton, Va.—Will you kindly explain how to locate the points 13 and 14 in Fig. 23 on page 394 of the December issue of *Carpentry and Building?* All the rest of the matter is perfectly clear and is a great help to all carpenters who are not stairbuilders.

Answer.—The above inquiry was submitted to Morris Williams, who comments upon it as follows:

If the correspondent will refer to the February issue he will find an answer to the query of "G. H. G.," Philadelphia, which will greatly help him to locate points 13 and 14 in Fig. 23 on page 394 of the December issue.

The accompanying diagram will be an additional help, so that between the two all the details of Fig. 23 of the December issue will be thoroughly understood.

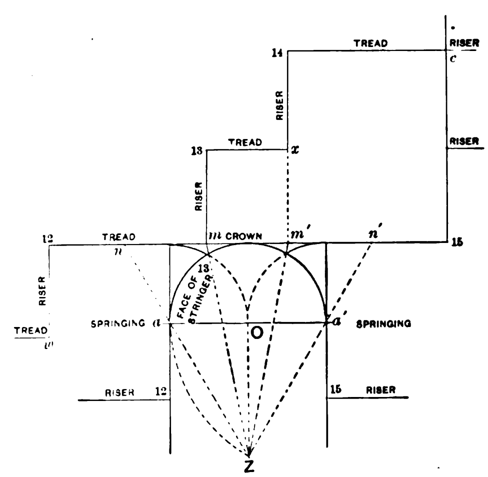
In the February number the plan of points 13 and 14 is projected from the elevation, while in the accompanying diagram is shown the reverse; namely, the elevation projected from the plan, &c.

Describe the semicircle *a a'* from the center O to represent the concave face of the stringer, and with the same radius describe the two quadrants from *a* and *a'* as centers. These quadrants will cut the semiplan curve in the points 13 and 14, respectively, thus dividing the semicurve into three equal parts. Now take *a* or *a'* as a center, and with the radius *a a'*, which is the diameter of the semicurve, turn around as shown from *a* to Z. From this point draw a line through *a* and *a'* on each side of the cylinder to cut the crown tangent line in the points *n* and *n'*. The distance from *n* to *n'* on the crown tangent line will indicate the stretchout length of the semicurve, which as before said represents the concave face of the stringer.

Again from Z draw lines through the points 13 and 14 to cut the crown tangent line in *m* and *m'*. The distance between *m* and *m'* indicates the stretchout length of the portion of plan curve between points 13 and 14; so also does the distances from *m* to *n* indicate the stretchout length of the portions of plan curve shown from 13 to *a* on the one side, and from 14 to *a'* on the other side. Because the three portions of the semiplan curve are equal, the stretchout length of each portion therefore will be equal, as shown from *n* to *m*, from *m* to *m'*, and from *m'* to *n'*, on the crown tangent line.

Now on the left side measure from *n* to 12 a distance equal to the distance *a* 12, shown on the plan to be the distance from the springing to the twelfth riser, and on the right side measure from *n'* to 15 a distance equal to *a'* 15 from the springing *a'* to the fifteenth riser.

We have now upon the crown tangent line a complete stretchout length of the plan face line of the stringer extending from riser 12 on the bottom flight and all around the cylinder, to riser 15 on the upper flight, as shown upon the crown tangent line from 12 to 15.



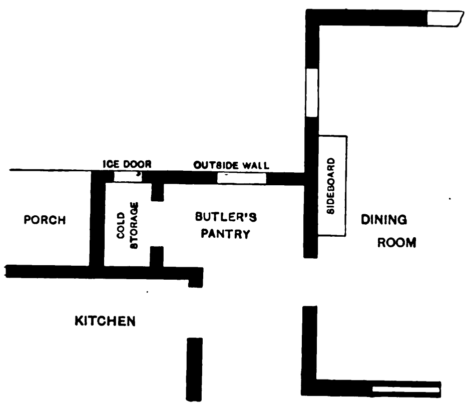
Locating Points for Getting Treads and Risers in Stair Building.

To draw the elevation of the steps 12, 13 and 14, proceed by drawing a riser downward from 12 on the crown tangent line as shown to *w*. Upon *m* draw another riser upward as shown to 13, then a tread as shown to *x*; again a riser to 14, and a tread from 14 to *c*, which completes the elevation of steps 12, 13 and 14. From the diagram, as it now appears, it will be clear to the correspondent how to locate points 13 and 14 in Fig. 23 on page 394 of the December issue. What he and others ought to remember is that in these figures we are dealing with the stringer and not with the rail, as in other figures.

Construction of Walls for Cold Storage Room.

From H. J. H., Missoula, Mont.—I am sending a sketch representing a plan of a dining room with butler's pantry adjoining, and would like to have the readers tell me how to construct a secret drawer or receptacle for the silverware. I would say that it should be about 12 in. deep and about 2 ft. square. It need not necessarily be a drawer in the strict sense of the term, but simply a place to keep the dining room silver.

I would also like to have described the best method of construction and insulation of walls for a cold storage room. I desire especially to be informed regarding the outside door through which the ice is received from the wagon. The plan which I send shows a portion of the butler's pantry partitioned off for cold storage purposes. The room is 3 ft. by 4 ft. 9 in., has a ceiling 9½ ft. in the clear. Any information on the points raised will be greatly appreciated.



Construction of Walls for Cold Storage Room.

It is needless for me to acknowledge how much benefit I derived from *Carpentry and Building*, as it is impossible to read it without being enlightened.

"X. Y. Z." Greets His Old Friends.

From X. Y. Z., Springfield, Ill.—Yes, Mr. R. W. McDowell, Uniontown, Pa., I am the veritable "X. Y. Z." of Springfield, Ill. I am very glad to be remembered by you or any other of that noble band of correspondents of the '80s. I would like, metaphorically speaking, to reach out my hand across the prairies and woodlands, the hills, valleys, rocks and mountains that lie between us and shake hands with you. I would like also, metaphorically, to stretch out my hand the length of time that has elapsed since the '80s and shake hands with all who contributed to the Correspondence Department, and who did so much to enliven the columns of *Carpentry and Building* of that early period. The larger part of them kindly dispensed their wisdom for the benefit of the readers of the journal of that day, and some of them, I was of the opinion at that time, dispensed with some wisdom.

If I am not able to shake hands with them all I would like to hear through the columns of the paper from as many as remember "X. Y. Z." Probably to shake hands with them all, I would have to reach, for many of them, into the land of which we know so little. The initials of those that come to my mind at this time are:

"W. B.," Springfield, Mass.
"G. H. H.," Philadelphia, Pa.
"H. McG.," Paterson, N. J.
"D. W. K.," Lockport, N. Y.
"A. S. L.," Concord, Mass. (The Poet).
Andrew Doremus, New Jersey.
"E. W. C.," Randolph, Mass.
"J. B. H.," Baltimore, Md.
"O. M.," Chicago.
"C. R. P.," Pittston, Pa.
"A. A. F.," Cleveland, Ohio.
"D. M. W.," Caledonia, Mich.

If the initials of any of my fellow contributors do not appear in this list, charge it to the "forgettery" of "X. Y. Z.," which seems to be improving with age, rather than to a want of appreciation of their contributions.

It would gratify me to know how many remember the discussions between "W. B." and "G. H. H."

Can we not have a reunion in the columns of *Carpentry and Building?* I am still of the opinion, which I formed at that day, that the Correspondence Department of the paper would do more to call out the unpublished experience of the better class of the craft all over the country, than any other means which could be devised.

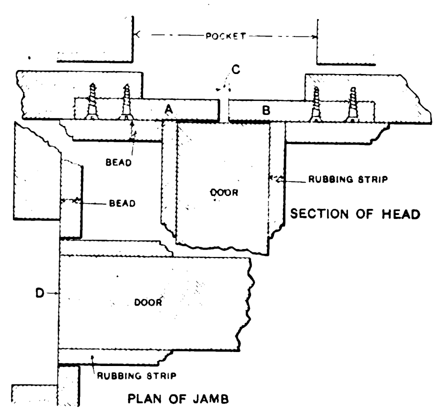
Conical Roof Plan Wanted for Reservoir.

From J. B., Rockland, Mich.—Will some of the readers of the Correspondence columns kindly furnish a plan of a conical roof for a reservoir which is 60 ft. in diameter. The reservoir itself is 8 ft. deep, with 12-in. concrete floor and 24-in. walls. It is excavated so that the roof is just above the ground. I should hardly think it necessary to figure snow pressure.

Constructing and Hanging Sliding Doors.

From G. H. G., Philadelphia, Pa.—In the January issue of the paper, page 24, J. T. Brown of Osgood, Ind., asks for a method of constructing and hanging sliding doors. I inclose a sketch showing a method of constructing the head and jamb of such doors, either single or double, which I have always found to be satisfactory. Loose pieces marked A and B on the drawing are screwed to the head, as shown, and then covered with a bead, also fastened with screws. These pieces can then be removed at any time without trouble should it be necessary to get at the pocket.

Referring now to the plan of the jamb, I would say that the door should be so made that when it is closed the back at D should be on a line with the face of the jamb, so that the door can be easily removed. This method has always been entirely satisfactory, but I should like very much indeed to have the readers suggest any improvements that may occur to them. The opening C at the head can be made larger by cutting the pieces A and B narrower should circumstances require it.



Details Showing Construction of Sliding Doors.—Submitted by "G. H. G."—Scale, 3 In. to the Foot.

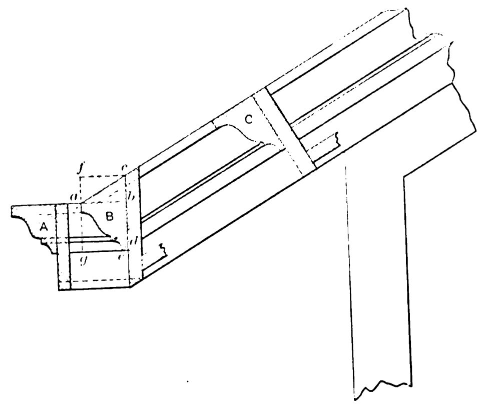
A Tribute to the Value of "Carpentry and Building."

From A. B. C., Yarmouth, N. S.—I have been a constant reader of *Carpentry and Building* for 27 years, having every number since January, 1882, and a number of volumes are nicely bound. I derive a great deal of pleasure and profit in my spare time from going over the files of back numbers.

F. D. Crandall, writing in the January issue of the current year, voices my sentiments exactly when he says he considers *Carpentry and Building* the best paper of its kind published. I am a reader of a number of trade papers and consider *Carpentry and Building* the peer of them all.

Cutting Raking Moldings.

From C. J. M., St. Johns, Newfoundland.—In looking over the February issue of the paper my attention is drawn to the first communication in the Correspondence Department which is that of "J. B.," Providence, R. I., wherein he describes a miter box "which is intended for use in cutting raking moldings." To this I have nothing to say, as it is all right theoretically at least, though I would not like to be compelled to use it on an eave



Cutting Raking Moldings as Suggested by "C. J. M."

scaffold about 2 ft. 6 in. wide and about 25 or 30 ft. from the ground. There is, however, an idea in "J. B.'s" article that is quite new to me. He says: "In doing this work first cut the miter on the level molding, &c.," from which I infer that he means to use a stock molding for the level eave and work out by it the one for the rake. Now this is something that at first I could not at all understand, for I have always looked at it the other way about, and with good reason, as I hope to show with the help of the accompanying sketch.

The drawing presented herewith represents part of a flying eave. To make a good job of this eave a solid molding is required along the level eave and up the gable to which to nail shingles. Now let us take a piece of stock molding as A, cut a miter on it and put it in position where it will intersect the raking molding as at B. It is easy to see that this will not do because it leaves a three-cornered cavity right where the under course of shingles is to be nailed if a good job is required. This is plainly indicated by the triangle *a b c.* There is also a little triangular piece of the level molding left standing below the under edge of the raking one at *c d.*

Now let us reverse the process and see how we shall come out. Let us take a piece of stock molding as C, miter it with the rake and put it in place. We now see that we want a piece like the section *a c d e* to intersect it properly. We also see that the size of the piece from which the level molding is to be worked is obtained by the thickness and plumb cut of the raking molding as indicated by the rectangle *f c g d.*

It would be easy now to obtain the profile of level molding by cutting a miter on the piece and marking it by the miter cut of the raking molding, but that is only a handiman's job after all; a good mechanic should be acquainted with the way to develop the shape of these moldings one from the other and work them out so as to properly intersect.

This is the way such work was done when I first joined the Noble Order of Chips, but in these "milling" days a great deal of the art of such work is lost.

Drying Blue Prints to Prevent Wrinkling.

From D. M. R., Michigan.—Will some brother craftsman kindly give me information as to the best method of drying blue prints after washing so as to prevent creasing or wrinkling?

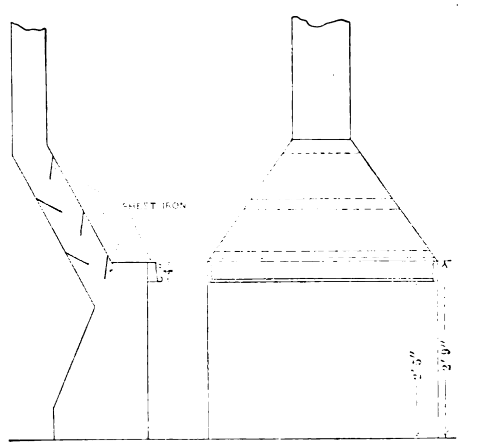
I am a comparatively new reader of *Carpentry and Building*, but find in its columns much that is interesting and valuable.

Why the Fireplace Smokes.

From G. R., Kelowna, B. C.—Having read the letter of "F. B." in the December issue, in reference to a smoky fireplace, I submit the following as a cheap and effectual cure for such a trouble. The drawing shows a sheet iron box that should be made the shape of the throat and inserted in the chimney with the front extended down 4 in., so that the hight of the opening into the chimney from the floor should be but 2 ft. 5 in., instead of 2 ft. 9 in., as it is now. Into the sheet iron box he should rivet pieces of sheet iron arranged as shown by the sketch herewith, to interfere with downward currents. The box can be nailed firmly to the brickwork in the chimney and the baffle plates will stop any currents blowing down the chimney. When he has applied his remedy and had success with it I hope he will inform the readers what he did.

From D. M. G.—In your issue of December a correspondent asks: "Why does the fireplace smoke?" He says a practical mason built both the fireplace and chimney. He says "the fire will draw a newspaper up the flue while the smoke will come out into the room." There is obviously a downward draft which is greater than the tendency upward. A round flue, says Daniel Littlefield, one of the greatest stove men who ever lived, is preferable to a square one, for, he says, the corners of a chimney will find a downward current while smoke is ascending upward in the middle of the chimney. Strange as it may seem, he says there are two currents going ou at the same time, hence most of the large chimneys are constructed round.

In the case of this Bolton Landing correspondent, the

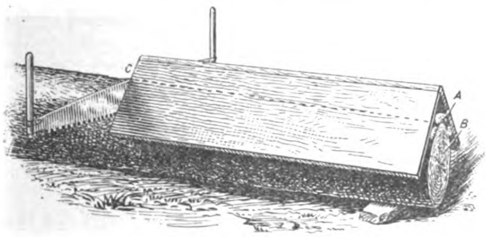


Why the Fireplace Smokes.—Remedy Suggested by "G. R."

difficulty may arise from a fire stopper being open either above or below; a wash range in the cellar with dampers open may produce the same results. This correspondent does not say whether the wind blowing from any direction produces the same result or in the absence of wind, which usually has much to do with determining the cause of the difficulty. A damp cellar is detrimental to a strong draft.

The writer once set up a range at a country farmhouse remote from any building or any trees. The range being a new one and with good wide flues there was no reason apparent why it should not give good results, but smoke it would in spite of all our efforts to make it work. At last resort we put a couple of lengths of stove pipe on the top of the chimney, but all to no purpose. Finally viewing the situation over at a distance of a third of a mile to the northwest was a piece of woodland. Thinking possibly the wind from that section might make some difference, we put several more lengths of pipe upon the chimney, which produced the desired results.

There are so many seemingly little things of themselves that will prevent a proper tendency of the draft



Miter Box for Round Timber.

that go to bother a stove man's life. For instance, the writer at one time set a stove up on a certain street and it failed to work satisfactorily; taking it across the street and setting the same stove up it worked all right.

From P. S. F., Portland, Maine.—Referring to page 406 of the December issue, would advise "F. B." to enlarge the throat of his chimney. This should be done by straightening the back until the opening is 8 in. It would also be preferable to carry the narrow part a little higher than shown. In other words, the present size of 5 in. by 2 ft. 6 in. contracts the delivery into the chimney too much, and it should be made 8 in. by 2 ft. 6 in. It is important that there should be some inlet into the room, such as an open door or a window or some other opening to supply an air circulation. The cut does not show that the chimney is above the crest of the roof. It should certainly be lifted that high if it is not.

Miter Box for Round Timber.

From Jack Plane, Portland, Ore.—The accompanying sketch shows the manner of making a miter box for use on round timbers, which will be found useful, especially when they are to be sawed with a two-man cross cut. With it almost any one who is able to handle a saw can turn out a good job. It is of considerable advantage in cutting out rustic work, &c.

Where particular care is needed in squaring or mitering the end of a log that has an extra amount of taper, subtract the radius of the smaller end at B from the radius of the larger end at C and block up the miter box over the small end an amount equal to the difference found. The block is shown in position at A, the dotted line indicating the top of the log.

The box is made by nailing together two 1-in. boards at right angles. They should be wide enough for the lower edges to come below the center of the log. The saw is easily guided along the ends of the box.

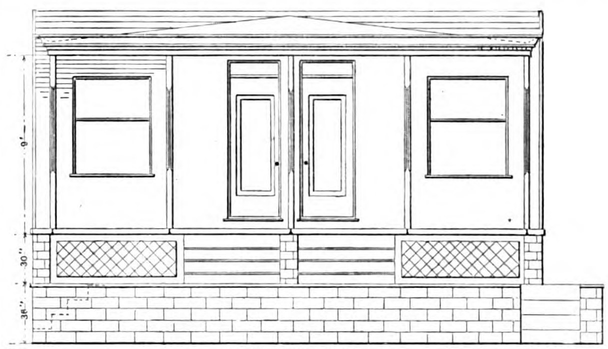
Discussion Wanted on the Septic Tank.

From E. M. S., Lents, Ore.—I have read with great pleasure and much profit the discussion printed in the January issue of the paper on the operation of domestic septic tanks, being based upon a paper read at the 1908 meeting of the American Society of Inspectors of Plumbing and Sanitary Engineers, by Herbert F. Shade, Plumbing Inspector of Victoria, B. C. In a country village or town where the lots are necessarily small is the "subsoil irrigation" system of drainage better than the cess pit? If so, what is the objection to the cess pit? In the illustration accompanying the article in the issue of the paper for May, 1908, there is shown an air inlet. Is it necessary to have this air inlet, and, if so, what is its function?

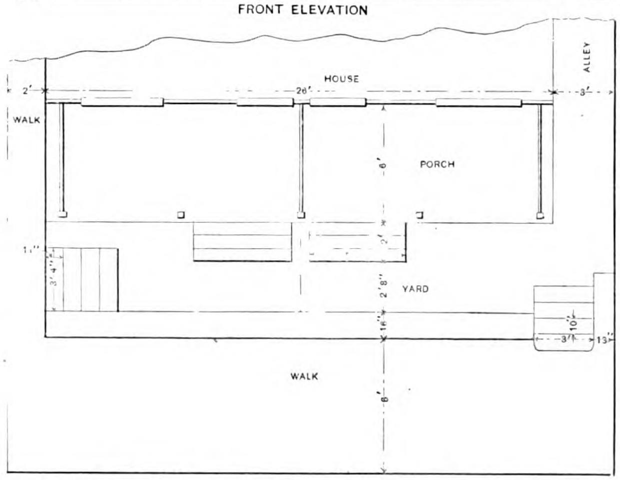
In this part of the country septic tanks are a new departure, and I would, therefore, be glad to see more discussion of the subject in *Carpentry and Building*.

Improving the Appearance of a House Front.

From W. G., Penbrook, Pa.—I am sending a blue print of my house, representing a partial plan and elevation and indicating the front porch and yard arrangement. The street on which the house is located was graded to a depth of 3 ft. after the house was built, thus necessitating a 36-in. retaining wall. The effect is to set the house too high and too close to the street to look well. It will be noted from an inspection of the plan and elevation that the porch steps are very steep and narrow, as well as unsightly, taking almost half of the front yard area. Will some reader kindly show me how to improve the appearance of this front? I would like



FRONT ELEVATION



Improving the Appearance of a House Front.—Plan and Elevation of Porch.—Scale, 1/8 In. to the Foot.

to use the porch and retaining wall as shown, as it is practically as good as new.

Making a Flag Pole.

From A Reader, Spokane, Wash.—I want to erect on the lawn a flag pole about 30 ft. in hight, and shall appreciate it if some of the members of the "great carpenter and builder" family will tell me the best way to work it out of a suitable tree. I would like to know what are considered the most suitable proportions for strength and appearance. I have noticed quite a difference in the looks of flag poles, and presume there is a "knack" in the making, as there is in many other things.

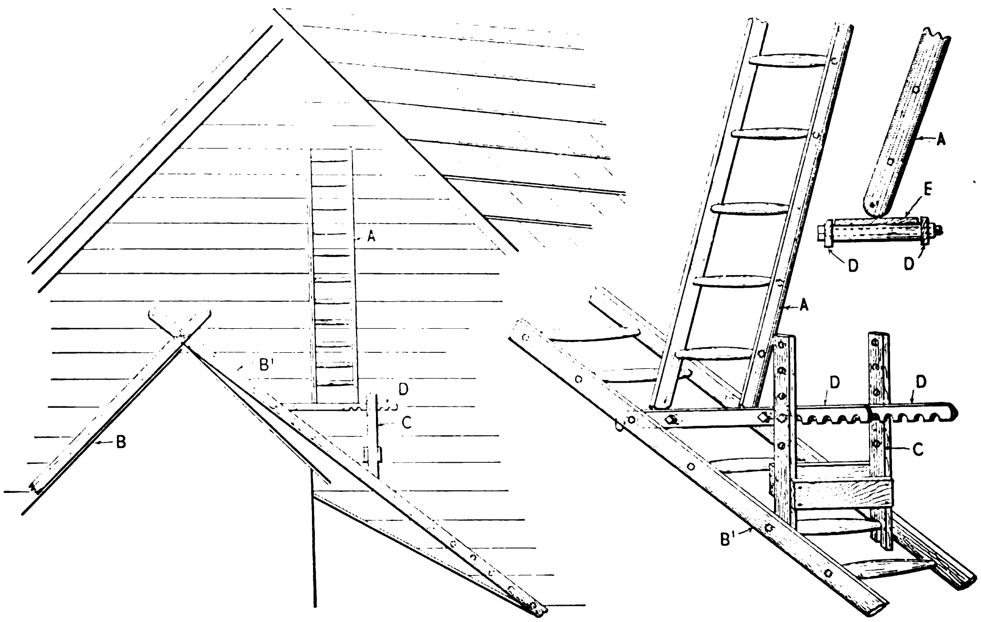
Perhaps some ship carpenter can throw light on the subject, for these mechanics can work wonders with rough timber, as is evidenced by the neatly shaped spars and masts which they turn out in every shipyard.

Details of a Painter's Scaffold.

From I. G. Bayley, Cape May Point, N. J.—A painter is sometimes put to the test of his ingenuity when taking a contract for painting to know the best kind of rigging which should be used under certain circumstances. This was experienced recently when one of the trade undertook to paint an old-fashioned house which looked very much as though it had been put together piecemeal. Against one of the gable ends of the main building two sheds had been built which prevented a long ladder being placed against the gable from the ground. At first it was thought to support a scaffold from the gable eaves, but the peak of the higher shed would not permit the scaffold to drop very low down, so it was hardly considered worth while.

The following method, however, was then resorted to and with very satisfactory results. Referring to the sketches, two ladders, B and B′, were tied together at the ends and placed over the peak of the higher shed as shown. A support, C, was then made from hardwood, bound together near the lower end with two flat strips on each side and with ends cut out to fit over the rounds of the ladder B′. The two sides were furnished with holes about 3 in. apart for the insertion of a long bolt with easily adjusted nut. Two strips of hardwood or metal, D D, were furnished with five or six notches about 3 in. apart, made to fit nicely over the bolt in C. At the other end of the strips D a notch was made to fit over the round of the ladder B′. The sides D were clamped rigidly together with two long bolts having a wrought iron pipe separator as shown in the small sketch at the right. A board E was placed across the two separators upon which was supported the bottom of the working ladder A.

On account of the holes in C and the notches in D the contrivance was adjustable to suit any angle of roof simply by taking out the long bolt in C, moving it higher or lower, or by changing the hold on the bolt by using different notches in the sides D. No difficulty whatever was experienced, and when the job was finished the contrivance was added to the collection of a painter's useful accessories.



Details of a Painter's Scaffold.—Accompanying Letter of I. G. Bayley.

The Care and Use of Planes.

From J. R. M., Dallas, Ore.—I wish to congratulate the editor upon the excellent variety of the articles which made up the first issue of *Carpentry and Building* for the new year. It certainly promises well for the remainder of 1909. I consider that the manner in which the query, "Why the Fireplace Smokes?" was answered should be a matter of justifiable pride to any paper fortunate enough to be the medium. The information was comprehensive, direct and, above all, promptly rendered.

I am sure the editor has "struck a good lead" in the series of articles just started by Edward H. Crussell, entitled "The Jobbing Carpenter and Some of His Work." I like the way he goes at it. I am anxious for the next installments.

If I may be accorded the liberty, I would like to suggest an article on the use and care of planes, beginning with the block and going up as far as may be. My observation and experience teaches me that there are very, very few carpenters who really understand the plane, even when it is new, while it is next to impossible, at least in this section of the country, to find one who can improve the condition of an old one. This suggestion is in line with that made by "L. K.," Cragsmoor, N. Y., on page 20 in the issue for January of the current year.

Constructing Windmill for Operating Smal Shop.

From S. P. M., Sterling, Ill.—I would like to ask some of the brother carpenters if they will describe through the Correspondence columns a method of making a windwill sufficiently large to operate a small shop equipped with such machinery, for example, as a grindstone, a small saw, a washing machine and other small machines requiring light power.

I have been a reader of *Carpentry and Building* for five years and I could not do without it.

Trouble with White Pine Doors.

From B. & S., Hamilton, Canada.—We have had some trouble with our white pine doors as regards the sap stain appearing after the doors have been varnished or oiled. The doors are sent out perfectly clear as regards stain, but after they have been varnished the white sap turns. We should like it very much if some of the practical readers of the paper, especially among the millmen, would give us any information they may have in regard to this matter, stating whether it is the fault of the varnish, dampness of the building, or what is the probable cause of the trouble and how it may be prevented.

Details Wanted of French Windows.

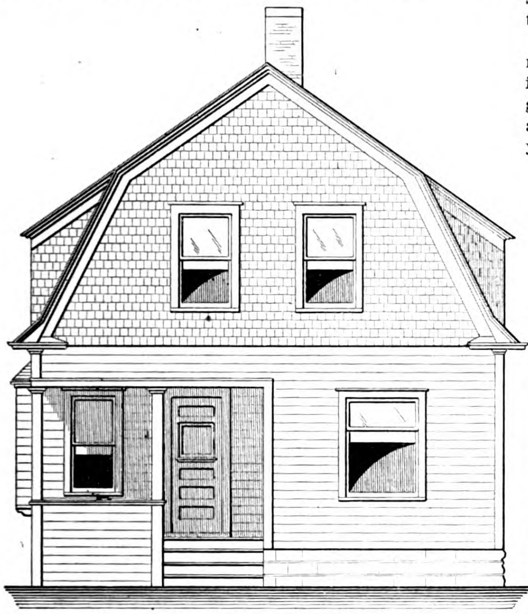
From G. B. S., Montgomery City, Mo.—Will some one please furnish through the Correspondence columns of the paper details of French windows—not casement windows—and greatly oblige an interested reader of this most valuable publication?

Design of a Six-Room Cottage.

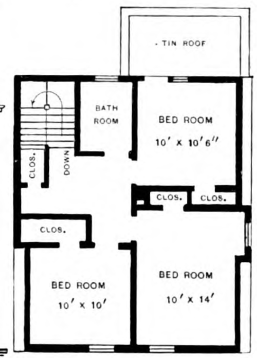
From W. S. Wylie, Greeley, Colo.—The blue prints which I am sending relate to a small cottage that I built in this place for rent, and as there are often plans of small houses appearing in the Correspondence Department, I have thought this one might be suitable for publication. I would state by way of explanation that I originally built it by myself without any assistance in the carpenter work, taking my time to do it. There is a cellar under practically the entire area, the foundations being of cement blocks, set about 3 ft. outside the excavated portion, and resting on a footing of concrete, except under the dining room on the side where the cellar stairs are located, at which point the wall extends to the bottom of the cellar.

The outside frame of the cottage is covered with common boards, over which is a layer of building paper, this in turn being covered with 4-in. pine siding. The front gable and dormers are shingled. The floors are single and laid with 4-in. yellow pine. The inside finish is yellow pine in good stock patterns. The bathroom has a 4½-ft. rim roll enameled tub and low down flush tank water closet. The kitchen has a 30-gal. hot water tank with connections to bathtub and sink.

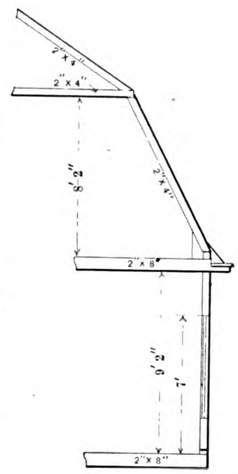
The house cost approximately $1500 two years ago. It is wired and fitted for electric lighting, also has hot air stacks in the walls so as to heat the rooms on the second floor, although no furnace has yet been installed. Everything about is ready in case one should be needed.



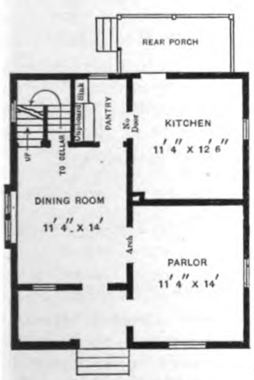
Front Elevation.—Scale, ⅛ In. to the Foot.



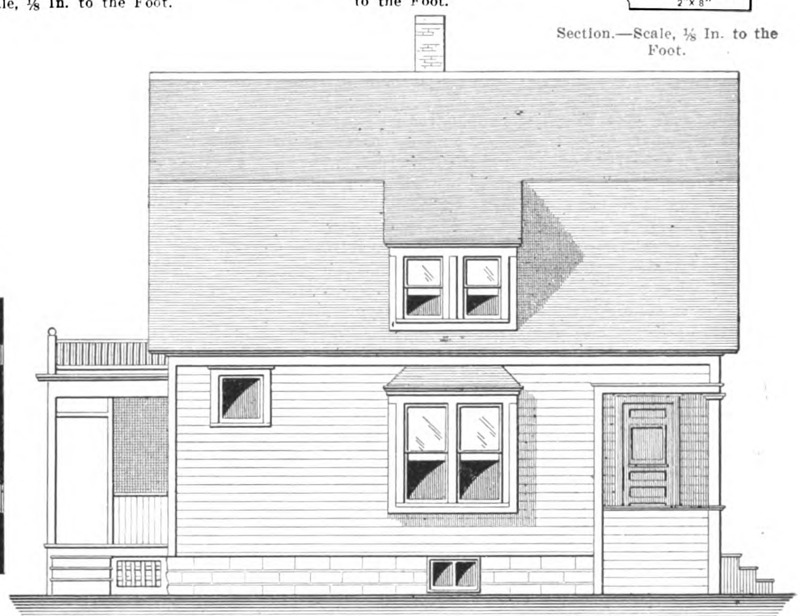
Second Floor.—Scale, 1-16 In. to the Foot.



Section.—Scale, ⅛ In. to the Foot.



First Floor.—Scale, 1-16 In. to the Foot.



Side (Left) Elevation.—Scale, ⅛ In. to the Foot.

Design of a Six-Room Cottage.—W. S. Wylie, Architect, Greeley, Colo.

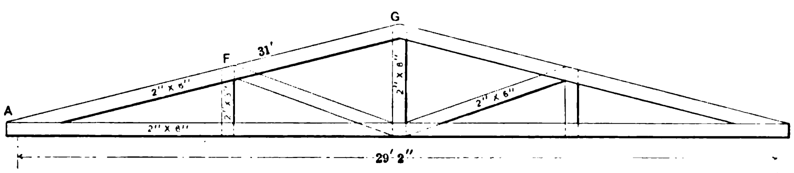
Methods of Figuring Estimates of Cost.

From R. S. S., Cleveland, Ohio.—I would answer the inquiry of "B. F. K.," Stanstead, Canada, by saying that builders do not estimate excavating and plastering by the foot, nor stonework by the cord, neither do they recognize the pitch of a roof by the number of inches in it. Why not estimate the circumference of the earth by the foot, yard or rod rather than miles? Simply because it is not in accordance with the rules of scientific principles. When we speak of one-half, one-third or one-fourth pitch it means the hight of the roof is equal to one-half or one-third or one-fourth of the width of the building.

If "B. F. K." is a reader of *Carpentry and Building* he will find many ways for ascertaining the bevel and lengths of rafters that will discount the one he suggests. If not, he should make it known. I would say that 8 in. on the tongue and 12 in. on the blade will give the bevel on one-third pitch, but "stepping" is not the best way to get the length of a rafter. I have known men who lay out rafters by stepping off lengths, using a 2 x 4 pencil, and at the end of 12 steps were all of an inch too long and wondered what was wrong when they found the rafters open at the point. Such work as that always looks like Sherman's definition of war.

Roof Truss for Odd Fellows' Hall.

From E. J. M., Lindenhurst, N. Y.—I inclose a rough sketch of trussed rafters which I propose to use in connection with an Odd Fellows' hall in this village. The truss will be called upon to support a galvanized iron standing seam roof, 28 gauge on ⅞-in. roofing boards and metal ceiling on ½-in. W. P. box, and tar paper under both. The supporting strength of the construction shown has been questioned, and I therefore submit it to the expert readers of the paper for attention.



Roof Truss for Odd Fellows' Hall.

Answer.—The sketch of our correspondent, with accompanying data, were submitted to C. Powell Karr, C. E., who furnishes the following comments in reply: The drawing of the correspondent does not agree with his figures, therefore I have followed the figured dimensions rather than the scale. His truss scales about 60 ft. to the ¼ in. instead of 30 ft., and the rise by scale is 5.2 in. per foot run. I have taken the effective span as 29 ft. 2 in., and the rise at 3 in. per foot run, as the correspondent states. From the data given the loads are made up as follows:

	Pounds.
Galv. iron roofing, 3½ lb. per sq. ft. } ⅞-in. roofing boards, 2 lb. per sq. ft. } 5½ × 2 × 30 × 2 =	660
Wind load on vertical surface for each truss = 3½ × 2 × 40 =	280
Snow load = 20 lb. × 2 × 30 × 2 =	2,400
Ceiling boards, ½-in., = 30 × 2 × 1 lb. =	60
Metal ceiling = 30 × 2 × 3½ lb. =	210
Roof truss =	263
Total load on each truss =	3,873

Which would give a panel load of 1291 lb.

It is apparent upon the first inspection that the length of the member AF, for example, in inches divided by the least dimension of the same member in inches, viz., 2 in. would give a prohibitive ratio to the load to be supported; but considering the least dimensions to be 4 in., we should have $\frac{l}{d} = 45$, which corresponds to an ultimate strength of 1555 lb. per square inch for spruce, or a safe load of $\frac{1555}{4} = 389$ lb.

By the stress diagram, made in accordance with the above load, the stress on the member AF, the one strained the most, amounts to 7914 lb. Now $\frac{7914}{389}$ = about 20 sq. in., or say a piece 4 x 6 in., which is the least section that will meet the requirements of the conditions as stated. Therefore, the truss as shown is unsafe.

Information on Boat Building Wanted.

From J. J. M., Doncaster, Md.—I would like to see published in the columns of the paper a series of articles on boat building, steam boxes, clamps and other tools used by boat builders. With a view to giving my brother craftsmen an idea of the kind of information I desire I would say that I want to construct myself a clinch built skiff or dory, about 25 or 30 ft. long. Any information on the subject of boat building will, I am sure, be read by many who like myself have had little or no experience with boat building, and live in a locality where there are no boat builders. Let us hear from the practical boatbuilders.

Trouble with Hollow Cement Block Walls.

From D. H., Thompsonville, Conn.—Will some of the readers of *Carpentry and Building* who have had experience suggest a remedy for the following trouble with hollow cement block walls? The building in question is a Monitor store building of hollow cement blocks and plastered with Ivory pulp plaster directly to the blocks on the inside. It was thought that the air space in the blocks would answer in place of furring, lath and plaster, but in cold weather shoes on the shelves will mold in the boxes if they happen to touch the walls. This is not from dampness coming through the walls, but rather from condensation, as the blocks being quite thick at the ends the walls become very cold. I would like to find a remedy for the trouble without the bother and annoyance of lathing and plastering, as this would tend to keep the shelving down too long and might necessitate its being taken apart. Would some of the new wall coverings, such as Beaver boards, answer the purpose?

Preparing Blue Prints by Gas Light.

From J. H. G., Chester, Pa.—I often have occasion to make blue prints, and being employed during the day as a carpenter, I have only the evenings available in which to do the work. I am aware of the fact that prepared paper can be purchased and turned into blue prints by the daylight, but I wish to know if there is any solution by which I can prepare my own paper in cases of emergency and turn them into blue prints by gaslight.

The Architect and the Millman.

From William Whitney Lewis, Boston, Mass.—I have been much interested in the article in the December issue entitled "Architects Criticised by a Millman," and consisting of a reprint from the *Mississippi Valley Lumberman*. What the writer has to say is most interesting, and it seems probable that he has encountered some architects who as the boys would say were "on" to their own business and that of some others. With regard to architects wanting something a little different to or from the regular sizes, and that their attitude adds 25 per cent. or more to the cost for the consumer by insisting upon this class of work, I would say that 25 per cent. may be added to the cost but probably 50 per cent. to the value as regards the owner. In my own practice other than stock sizes of doors and sashes are specified to prevent, on the part of the contracting builder, easy substitution of inferior ready-made stuff for custom-made work called for by the specifications. I often go so far as to call for sash being delivered at the works unstained in order that sappy and otherwise inferior stock may not escape detection.

The writer of the article says further: "In filling Government contracts it does not do to deviate in the least from the plans as prepared by the Government officials." If plans mean anything and the contractor agrees to do a specific thing or furnish a specific quality of work, why should he expect to be allowed to deviate from his contract? I suppose the contractor would expect to receive in payment for his contract dollars worth 100 cents each and not those worth 99.9 cents.

Again the writer says, "Some years ago I offered some suggestions which I thought very decidedly for the benefit of Uncle Sam and incidentally would help our firm filling the contract." In practice it is to be feared that Uncle Sam would reap the incidental advantage, if any, and the firm the decided advantage, certainly.

It is a pleasure to be confirmed in the belief that almost without exception the army officers are gentlemen and are faithful to their trusts.

Where the writer says "many a poor contractor has found to his sorrow," &c., I would suggest that he substitute for the word "poor" in this connection the word "shyster."

Still another point which invites comment is the one where the writer says: "The Government officials have a very arbitrary way of deducting allowance for minor deviations which seriously interfere with the profit account of the contractor." If deviations are only "minor" as regards the value and cost it would seem much fairer and on the whole the least expensive thing for the oppressed contractor to do if he fulfilled the contract both in the spirit and letter.

At another point the writer says: "There is no way of successfully appealing from their ruling," which seems eminently fair and just, since no delinquent contractor may hope to escape punishment, and at the same time it tends to make bidding on public work popular with capable and straightforward contractors.

I would say further that one object in employing a competent architect is to escape the nightmares and monstrosities usually embodied in the stock pattern molding, doors, sashes, stair posts, balusters, &c., as they are misconceived in the minds of the millman. I would not have it inferred from what I have said that I regard all millmen and contractors as the natural enemies of a long suffering public and my professional brethren; far from it. I find many mechanics who are capable and honest and who strive not only to fulfil a contract to the letter, but who take a pride in making their work monuments to their ability and integrity. Such do not very often have reason to complain of their treatment by architects.

The millman in question is presumably honest and efficient, so that he need not make personal application of any criticisms offered above.

A Peculiar Sheet Metal Problem.

From J. C. Bishop, Dowagiac, Mich.—While outside the pale of carpentry, the problem which I present is one that embodies principles likely to prove interesting and instructive to other old time readers of your valuable journal besides myself, I having taken the paper since the very first issue 30 years ago. I inclose herein a rough sketch from which I would like to see published in *Carpentry and Building* the lines for the requisite patterns from the elbows shown. The intention is to connect the stove with the fireboard, and if possible have a flat place on the pipe where it leaves the stove to be used for various purposes. At the fireplace the thimble is 6 in., and the collar on the top of the stove is equivalent to a 6-in. pipe flattened out to an oval.

Answer.—Our correspondent's inquiry introduces the readers of *Carpentry and Building* to a problem involving a somewhat more advanced degree of geometrical knowledge than do those usually discussed in these columns, but familiarity with a certain class of geometrical problems is essential to the mechanic in the building line. The more thoroughly he acquaints himself with geometrical science generally, the better is he equipped to meet any conditions which may arise. The methods employed in the greater part of solution here given are properly classified under the head of descriptive geometry, a branch of technical drawing which becomes a necessity to the mechanic in all the higher branches of constructive work. Its methods are being taught now to a greater extent than ever before in those training schools whose efforts are devoted to the education of young mechanics. By its methods the more difficult problems comprised in the laying out of timber can be solved. In most lines of work its operations are confined to the matter of elevations, plans and sections; but in the solution herein given, as is the case in sheet metal work generally, its operations extend to the development of curved surfaces—that is, the unrolling of such surfaces into plane surfaces, or, as familiarly expressed, into "the flat." It is through the department of developments that its methods become available to the woodworker. Considered in this light, therefore, the following solution may be both interesting and instructive to our readers.

In Fig. 1 we give a reproduction of our correspondent's sketch, in which all conditions and dimensions are

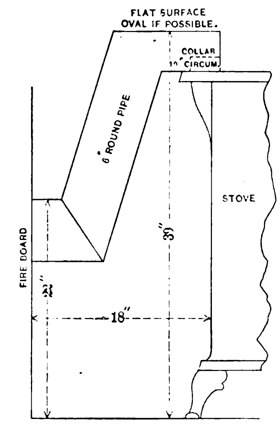


Fig. 1.—Reproduction of Mr. Bishop's Sketch.

A Peculiar Sheet Metal Problem.

carefully shown, with the exception that details are omitted from that part of the pipe immediately connected with the stove and for which he desires the patterns. The problem presented therein contains conditions somewhat novel even in the line of sheet metal work. The part in question, the horizontal portion, must be so constructed as to form a joint at one end (the right in Fig. 1) with a short piece of pipe whose profile is that of the collar on the stove, while its other end must form a joint or miter with the round pipe which descends obliquely at the back of the stove. Such pieces are by no means uncommon, but the general shape of such a piece is that which naturally results from the transition from one profile to the other.

Our correspondent specifies that the top surface of this section of the pipe shall be flat and (referring now to the legend on the drawing, Fig. 1) oval if possible. We may pause for a moment to remark that it seems to be a universal error to use the word "oval" when "elliptical" is meant. An ellipse is a symmetrical figure—that is, when divided by either its longer or its shorter diameter both halves are exactly the same, which is not true of the oval when divided by its shorter diameter. In other words, the word oval signifies egg shaped. We presume, however, that the simplest method of solution which will give the desired flat surface on top will be satisfactory without reference to its exact shape. We shall therefore show how the given shapes of the several parts may be utilized to produce the nearest approximation to an "oval" top which they are capable of, maintaining at the same time a uniform capacity throughout the course of the pipe so far as possible.

We begin the work by the construction of a plan and an elevation of the several parts of the pipe as shown in Fig. 2, which is drawn to a scale of 2 in. to the foot. Working drawings must, of course, be made full size, so that the patterns when obtained can be transferred at once to the metal and cut. The general outlines of these two views as given in Fig. 2 can therefore be redrawn full sizes—that is, each dimension multiplied by six—after which the subsequent operations can be conducted as explained herein.

In beginning the drawings, the high B C should be somewhat more than the width across the collar at its widest part, plus the hight of the collar above the stove, so that the capacity of the elbow may not be reduced in the least. From B draw B A horizontally to meet the outer line of the inclined pipe at A. Before going further with the elevation, we may begin a plan by carrying the points A, B and D upward to cut a center line drawn horizontally, as shown at A', B' and D'. Now bisect D' B', draw the vertical center line G H of the collar and complete the plan or profile of the collar, which becomes the profile of the vertical pipe E D C B of the elevation. This profile must, of course, be made to correspond exactly with that upon the stove. In Fig. 2 it has, for simplicity, been made to consist of two semicircles whose centers are at *c* and *d*, joined by straight lines. In many cases the sides of the profile are somewhat curved instead of straight.

In providing for the required flat surface on the top of the pipe, the line A B of the elevation can be assumed as an edge view of such surface, while its outline or shape must be determined upon the plan. To assist in this operation we may suppose for the time being that the inclined portion of the pipe is continued up to intersect with the plane A B, as shown at the points A and *e*. Since now the plane represented by the line A *e* is oblique to the sides of the pipe, A K and F L, a section through the pipe on this line will be an ellipse whose major axis is A *e* and whose minor axis is equal to the diameter of the pipe as shown in the profile below. This ellipse if represented upon the plan would pass through the points A' and *e'*. In consideration of the fact that, in the present case, the line A *e* is a very little greater than the diameter of the pipe and that only a portion of the section will be used, it will answer all purposes if we set off from A', on A' B' of the plan, a distance equal to the radius of profile S, as shown at *f*, and from *f* as a center draw somewhat more than half a circle, as shown. Lines drawn tangent to the circle just drawn and to the circles whose centers are at *c* and *d*, all as shown by *a''* H and *a'* G, will complete the outlines of what may be made a flat surface. To the several curves and sides of this surface patterns to form a satisfactory elbow can be made to meet without difficulty.

The surface A' *a''* H B' G *a'*, while neither an ellipse nor an oval, more nearly approximates the latter. Two other methods of solving the problem are possible. By one method the flat surface on top can be made a true ellipse, or even a figure of any shape, while by the other method the shape will be that of the common approximation to an ellipse consisting of arcs of circles; but both methods will be more complicated than that herein shown. As the shape just obtained in Fig. 2 includes the entire space within the outlines of the plan, which an ellipse would not, it is presumed that the shape there shown will be more acceptable than if the letter of the request had been complied with, because of the greater area thus obtained. We shall therefore proceed to show how the remaining parts of the elbow may be laid out.

From points *a'* and *b'* of the plan, drop lines cutting A B of the elevation as shown at *a* and *b*. Since the point E has already been fixed as the throat of this part of the elbow, we may draw a line from E to *b*, constituting the miter line between that part of the pipe which fits over the stove collar and the intermediate or transitional piece. In locating the point F, the throat of the second elbow, it is necessary to place it just low enough that the area of a vertical section through the pipe at F *g''*, and indicated by *g g'* of the plan, is equal to that of the round pipe; at least it should be no smaller than that of the smallest part of the pipe, which is in reality at the collar of the stove. This is simply a matter of figures, which we need not pause here to explain. If we assume 5 in. as a proper distance below the line A B to place the point F, we shall see by comparison that the area of the vertical section above mentioned is about equal to that of the profile of the round pipe. In the diagram in the lower left hand corner of Fig. 2 F *g g'* is a section on F *g'* of the plan and elevation, while the circle is the same as that of the profile S. Therefore draw F *a*, representing the miter line of the second elbow, and F E, the bottom line of the transitional piece, thus completing the elevation.

We may begin the developments. For the pattern of the inclined pipe, first divide its profile, S, into any convenient number of equal spaces, as shown by the small figures, and from the points thus obtained project lines parallel to A K to cut the lines A *a* and *a* F as shown. Since both halves of the pattern will be the same, one half of the profile may be used for both halves of the pattern. Inasmuch as neither of the points in the profile strikes the point *a*, the intersection of the two miter planes, this point *a* must be carried back to the profile as shown, where it is also marked *a*. The several spaces in the profile must now be set off on any straight line, as M N, drawn at right angles to the lines of the pipe and numbered accordingly, thus constituting what is termed a stretchout of the profile, one half of which only is shown in the drawing. From the several points on M N measuring lines are drawn parallel to A K, extending somewhat beyond a point opposite the miter to be made. Now from each of the points previously obtained on the miter lines project lines at right angles to A K, to cut measuring lines of corresponding number. A line traced through the points of intersection will give the required pattern, one half of which is shown by Q R T.

The method of developing the pattern for the vertical pipe is exactly similar to that just described. One half of its profile is shown by D' G B', the curved portion of which is divided into equal spaces, and the entire stretchout should be set off on the line A B of the elevation extended and numbered correspondingly, one half as before being shown. Only a portion of this profile miters against the oblique plane E *b*, and, as before, the point *b'* must be carried back into the profile and properly located in the stretchout, as shown by *b'*. A portion only of the points are included in the miter, the remainder being required to obtain the exact length of the stretchout. The projection of the points from the plan against the miter plane E *b* and thence into the stretchout is clearly shown.

The pattern for the intermediate section of the elbow, which, it will be observed, is irregular in shape, is obtained by a method known to sheet metal workers as triangulation, which consists in dividing its surface into triangles and then obtaining the true lengths of the several sides of each by a system of diagrams. In these operations it will be convenient to use the points along the two miter lines F *a* and E *b*, obtained in developing the previous patterns. With this part of the work in view, therefore, the profiles S and D' G B' should be so divided at the outset that those portions of the two miters which are to be connected by the transition piece shall each contain the same number of spaces. Thus in one half of the miter, F *a*, there are five spaces, which is also true of the miter E *b*, remembering that the point D' is exactly behind the point 8, as shown upon the plan. The method of procedure is to first connect points of like number in the two miters by a system of lines, and then to divide the four-sided figures thus produced by another system of lines diagonally, the latter system being dotted simply for distinction, thus cutting the entire surface of the part to be developed into small triangles. The triangulation may be indicated either upon the plan or the elevation, according to the nature of the subject. It is sometimes advisable to show it upon both views, in order to determine which view will best serve the purpose of obtaining subsequent measurements. In the present instance we have made use of the plane for this purpose.

Before beginning this work, however, it will be necessary to obtain a view of the miter *a* F in the plan. This can be accomplished in the following manner: Project lines from all the number points in a F vertically into the plan, cutting the center line A′ B′, as shown, between f and F′, and on each vertical line set off from the center line the length of lines of corresponding number in the profile S as measured from its center. A line traced through the points of intersection, as shown from a' to F′ of the plan, will give the required view. Now connect points of corresponding numbers in the two miters by solid lines, as shown by 8 8, 7 7, &c., and draw dotted lines connecting diagonally opposite points, so as to obtain the shorter diagonal. Thus a line connecting 7 of the miter a' F′ with 8 of the plan of the collar is shorter than a line drawn from 8 at the left to 7 at the collar. Follow the same order throughout the piece, connecting 6 with 7, 5 with 6, &c., as shown. Had the side lines of the stove collar been drawn curved, as mentioned above,

The true lengths of the dotted lines of the plan are obtained in exactly the same manner, all as shown by diagram Y at the left. Having now obtained the true lengths of all the long sides of the triangles, we shall find the lengths of their short sides or bases in the edges of the two miter patterns first obtained. Thus the true distances, a to 4, 4 to 5, &c., of the left end of the pattern of the transition piece are found between R and P of the pattern of the oblique pipe, while the true lengths of the spaces b to 5, 5 to 6, &c., for the end adjoining the collar are found between E′ and b' in the pattern for the collar piece.

It simply remains now to construct the several triangles indicated upon the plan one after another in their proper sequence. We may therefore begin the work most advantageously by constructing the triangle indicated by

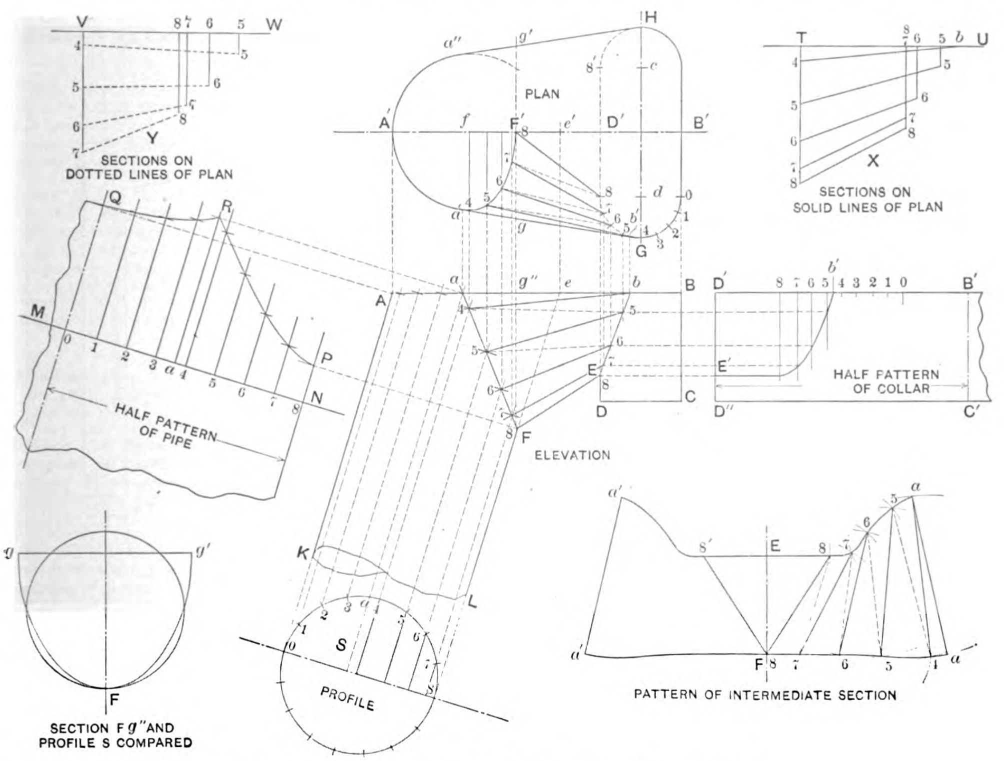


Fig. 2.—Design for Elbow and Method of Developing Patterns for It.

A Peculiar Sheet Metal Problem.

it would be necessary to add one or two more points in this curve between 8 and D′, from which solid lines could have been drawn to point F′ of the other miter. In obtaining the true lengths of the several solid and dotted lines of the plan, it will be seen that the horizontal distance between any two connected points can be measured upon the plan, while the difference in vertical distance between the same two points can be obtained from the elevation.

Therefore to obtain the true lengths of the solid lines of the plan construct the diagram shown in the upper right hand corner of Fig. 2, marked X. First set off their several lengths from T on the horizontal line T U, as shown by the small figures near U. From T and from each of the numbered points drop vertical lines, as shown. Upon the line from T set off the hights of the numbered points in a F as measured vertically to the line A B, numbering each point correspondingly. Upon each of the other vertical lines near U set off the vertical hight of the point of corresponding number in E b. Now connect points thus obtained with points of corresponding number on line T. The several oblique lines, 4 b, 5 5, &c., will then represent the true lengths of the corresponding lines of the plan of elevation.

8 F′ 8 of the plan, viz: Upon any line as a center line, as F E below the elevation, set off the length F E of the elevation and through the point E draw a line at right angles, upon which set off in either direction from E the distance D′8 of the plan, as shown by 8′ and 8, and draw the lines F 8 and F 8′. The same result may be obtained by first drawing the line 8′ 8, making it equal to 8′ 8 of the plan; then with the distance 8 8 of the diagram X as radius and the points 8′ and 8 of the pattern as centers, strike two arcs, intersecting at F. Proceed now to add to one side of this the triangle indicated by F′ 7 8 of the plan, viz: With the distance 8 7 of the diagram Y as a radius and the point 8 in the upper edge of the pattern as center, strike a short arc near F, which intersect with another arc struck from F as center, whose radius is P 7 of the miter pattern of the oblique pipe, thus establishing the point 7 in the lower side of the pattern. Now, with 7 7 of diagram X as radius and point 7 of pattern just obtained as center, strike a short arc, which intersect with another arc whose center is 8 in the upper side of the pattern and whose radius is the distance 7 7 of the miter pattern of the pipe to fit the collar, thus establishing the point 7 in the upper side of the pattern. Proceed in this manner, using as radii the

distances obtained in diagram Y in connection with those on the edge of the pattern of the oblique pipe in obtaining the points along the lower side of the pattern, and the distances in diagram X with the spaces on the edge of the pattern of the collar piece in obtaining the points in the upper edge of the pattern until all the distances have been used and the line *a a* is reached, which will complete one-half the pattern. That part of the pattern shown by *a* 8 8 *a* can be transferred by any convenient means to a reverse position at the left of the first large triangle, thus completing the entire pattern. It is understood that the necessary edges or laps required to make the usual form of joints must be added to all of the patterns. GEO. W. KITTREDGE.

Designs Wanted of Mission Study Table and a Box Wall Seat.

From Seemore, Bloomfield, N. J.—I was happy to note in the March issue of *Carpentry and Building* the design for a mission style bookcase contributed by Arthur W. Joslin, as it is something for which I have long been waiting. Now since I have this design I would be pleased if some of the readers would furnish for the columns drawings of a mission study table, rectangular in shape, and also of a box wall seat.

Information Wanted Regarding Porch Columns

From C. C. H., Brookville, Pa.—I wish to trouble the readers of the paper with a problem in regard to porch columns. I have a large porch which I am to remodel. It extends on two sides of the building for a distance of about 50 ft. on each side and has a round corner. It is fitted with 6 x 6 in. turned posts which are about 10 ft. long. My customer desires some design of column square in shape, taking away the present rail and balusters and making a tight balustrade with panels. Possibly the posts should be paneled rail high, but I want the ideas of the practical readers. I also desire details of different square columns they have been putting into porch work. My idea is to place square capitals on the top of the columns and possibly use shingles rail high as a balustrade. I shall greatly appreciate any information in this line, and it may be that what the readers have to say will prove of suggestive value to others than myself.

Laying Out a Newel for a Semicircular Winder.

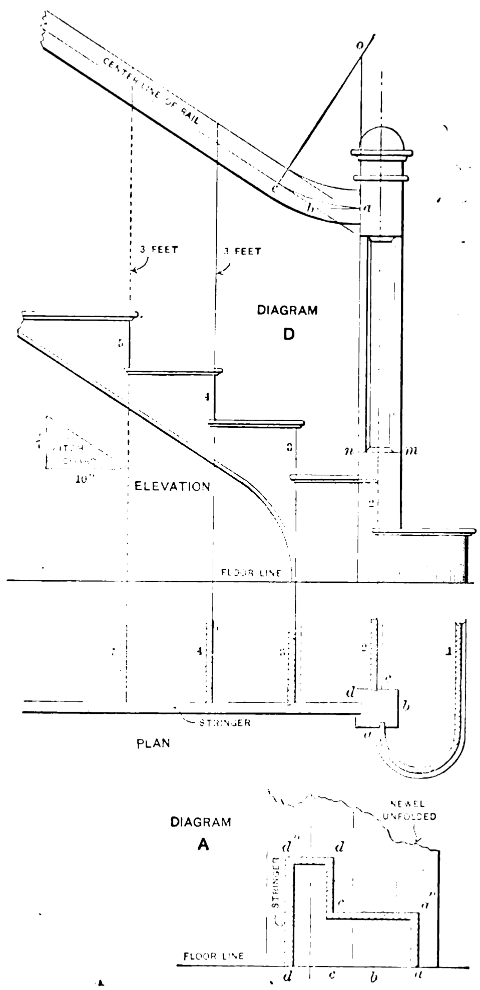
From A. W. S., Paterson, N. J.—The articles on stairbuilding now running in *Carpentry and Building* interest me very much, and I congratulate the author upon the comprehensive manner in which he is handling his subject. I would like to ask of him a favor through the Correspondence columns, and that is, to explain how to lay out a newel for a semicircular winder. I think I can manage the rest of the stairs, making use of the information presented in the articles on stairbuilding published.

Answer.—The diagrams presented herewith clearly show how to lay out a newel when a "bull nose" step or, as the correspondent above calls it, "a semicircular winder," is placed at the bottom of a flight. The plan of the step, newel and a few flyers is shown, above which is the elevation marked diagram D. The elevation of the steps is drawn with the pitchboard, starting at the bull nose upon the floor and moving it up as is the practice in laying out all straight stringers. The newel is projected from the plan, its center aligning with the face of the second riser, as shown.

Parallel with the face of the fourth or fifth risers draw lines to represent the balusters. Make the length of each equal to 3 ft., measuring to the top of the rail, and through these points draw the pitch line to the newel. Determine the thickness of the rail and continue this line also to the newel.

If an easement is required for the rail proceed as shown by drawing the line *a b* from the newel. Make *b c* equal to *a b*. From *c* draw the line *c o* perpendicular to the pitch of the rail, and from *o* draw the easement, as shown from *c* to cut the newel at *a*. On each side of this curve draw the curves to represent the top and bottom of the rail, cutting the newel above and below the point *a*. This determines the hight upon the newel where the square is to be to receive the rail. The square portion at the bottom of the newel, shown from the floor line to *m n*, may be made of any hight, providing it will be above the second tread.

Concerning the housings or groovings on the newel to receive the risers, treads and stringer, proceed as shown in diagram A, by unfolding the four sides of the newel indicated at *a b c d* of the plan. In this diagram it is shown that the riser of the "bull nose" step enters the newel directly in the center of the side *a*, therefore,



Laying Out a Newel for a Semicircular Winder.

mark the groove to receive it, as shown by the shaded portion from *a* to *a''* of diagram A.

From *a''* mark the housing for the tread of the "bull nose" to *c*. Upon *c* to *d* mark the housing for the second riser and from *d* to *d''* the housing for the portion of the second tread that intersects the newel, as shown in the plan, from the stringer at *d* to the second riser. Complete the housing by marking from *d''* to the floor line the groove to receive the stringer. Compare this diagram with the plan of the newel shown directly above it. Conceive it folded around the square there shown and the reader will readily observe that the grooves will receive all the risers, treads and stringer that are shown in the plan to intersect the newel.

The total length of the newel may be obtained from the elevation, as shown in diagram D.

MORRIS WILLIAMS.

WHAT BUILDERS ARE DOING.

THE marked improvement noted in projected building operations during the initial month of the current year has continued through February, and the record as compared with the corresponding month of 1908 is without a parallel in recent years. Reports at hand from leading centers of the country indicate that almost without exception the increases over last year have been very marked, this being especially the case in Greater New York, as will be seen from the figures presented in another column. This phenomenal increase in the estimated cost of building improvements in this city has been due in large measure to the rush of builders to file plans in anticipation of the adoption of a revised building code which is now under consideration. All indications point to an active building season, with employment for thousands of mechanics now idle in various branches of the building industry.

Chicago, Ill.

Some improvement in the situation is to be noted and building is being conducted on a fairly liberal scale. Last month permits were issued for 828 buildings to cost $5,159,000, as compared with 520 buildings to cost $3,634,600, in February last year.

The city is witnessing unusual activity in the central business district, where lofty office buildings, magnificent hotels and a new and first-class theatre are replacing small and old-fashioned structures. At the close of January there were 18 new downtown buildings under way or projected aggregating a total estimated cost of $33,800,000. In the outlying sections of the city factories, warehouses and dwellings are planned on a scale which is likely to bring the total for 1909 ahead of the year before by a large margin.

Cleveland, Ohio.

The number of building permits issued in Cleveland during the early part of March showed considerable increase over the previous month, and everything now points to a very busy year in building operations. The cut in price of structural steel is expected to stimulate the erection of the larger class of buildings in which steel is used in the construction. Work has already started on several fairly good sized mercantile buildings, and a number of other similar projects are now under consideration. Several of the contracts for the new 12-story Brotherhood of Locomotive Engineers' building have been let, and the erection of this building will be started by April 1.

During February there were 368 permits issued by the Building Inspector's office for structures to cost $544,390. This is a considerable increase both in number and amount over the corresponding month of last year. Of the permits issued during February 133 were for frame buildings to cost $215,831, 36 were for brick buildings to cost $211,835, and 199 were for alterations and additions to cost $116,724.

Denver, Colo.

The feature of the building situation during the month of February was the number of brick and frame dwellings for which permits were issued, the total estimated cost of these accounting for more than half the total estimated cost of improvements for which permits were issued in that period. The department of buildings issued 273 permits during last month for new work estimated to cost $819,948, while in February last year 195 permits were taken out for building improvements estimated to cost $558,650.

Of the total for last month 162 permits covered brick residences to cost $456,300, while 10 permits were for frame residences costing $12,800. There were two permits for apartment buildings costing $65,000 and 13 permits for business buildings costing $32,400. In addition, there were two hotels projected costing $96,000 and one school building costing $60,000.

The Board of Directors of the Master Builders' Association organized by electing on February 9 the following officers for the ensuing year:

President...........Thomas Bate.
Vice-President...... W. E. Towers.
Secretary.......... James B. Jackson.
Treasurer.......... C. C. Schrepferman.

It is stated that a campaign will soon be started to increase the membership of the organization by interesting all connected with the building industry. The master builders of the city at present look forward to a gratifying activity and intend to take a prominent part in every movement calculated to enhance the property of the city.

Detroit, Mich.

During the month of February building operations in the city were ahead of any corresponding month in the history of the Fire Marshal's office. There were permits issued for 204 new structures to cost $701,050 and for 20 additions to cost $71,250, making a total for the month of $772,300, as compared with $206,250 in February last year and with $529,300 in February, 1907, which up to that time held the record for the second month in Detroit's building history.

Elizabeth, N. J.

The annual banquet of the Master Builders' Association of Elizabeth was held on the evening of February 10 at Russ' banquet hall on Broad street, covers being laid for 175 persons.

Alexander Kerr, president of the association, was master of ceremonies and introduced in well chosen words the several speakers. Edward S. Williams of Scranton, president of the National Association of Builders' Exchanges, responded to the toast "The National Association"; Andrew Dickinson of Paterson, president of the New Jersey State Association of Builders, spoke on "The State Association"; Charles E. Van Sickle of Newark, president of the International Association of Painters, replied to the toast "The Master Painter"; Hugh D. King of Bloomfield talked upon "Industrial Education," while Alexander E. Pearson of East Orange spoke of "The Need of Builders' Associations."

Kansas City, Mo.

While the weather was not considered altogether propitious for building operations during February, there was no let up in the improvements projected, and the estimated cost of the new work was far ahead of that of the same month last year. There were 304 permits taken out for building improvements estimated to cost $839,525, as against 247 permits for new buildings involving an estimated outlay of $531,065 in February, 1908.

Of the total for last month 42 permits were for brick structures costing $341,400 and 131 permits were for frame buildings costing $449,300.

One of the improvements under way is a row of 45 houses on Harrison street between Twenty-seventh and Twenty-ninth streets, the work being done by N. W. Dible. The houses will be of brick and stone and of stone and brick veneer, no two designs being alike.

Los Angeles, Cal.

The building revival which struck the other Pacific Coast cities during February seems to have missed Los Angeles, and the returns for the month are rather disappointing. During the month 495 permits for new buildings were issued for structures to cost $584,470, which is a slight improvement over the same month last year, when a total of 584 permits for buildings to cost $576,342 were issued, but it is a falling off from the record for January, when 483 permits for work to cost $646,007 were issued. The falling off in the value of the new construction authorized is almost entirely due to a lack of new brick construction, this being the first month in many years when there was practically nothing done in brick or concrete. The results of the past month tend to confirm builders in their opinion that this is to be a strictly "frame" year in Los Angeles. For that reason it is possible that the record made will be considerably smaller than that of the last few years when so much costly work was done in the business section of the city.

The architects have in plan a large number of residences ranging all the way from simple cottages and bungalows to the more expensive dwellings of the rich, and builders are inclined to feel that the recent average of over half a million in new residences per month will be maintained.

Some of the outside towns of southern California are very active in a building sense, and Los Angeles builders and architects are turning their attention to some of these, including Pasadena, Santa Barbara and San Diego.

Minneapolis, Minn.

The fifth annual convention and exhibit of the Northwestern Cement Products Association was held at the First Regiment Armory, March 2-4. The Interstate Cement Tile Manufacturing Association held its third annual convention in conjunction with the Northwestern association, and upward of 300 delegates and members of both organizations were in attendance. Among the more important papers read were the following: "What Can Be Done to Popularize Cement Products?" by C. W. Boynton of Chicago; "Concrete and Cement Products," by Richard L. Humphrey of Philadelphia, president of the National Association of Cement Users; "Concrete and Common Sense," by Capt. E. A. Freeman of the United States Engineers; "Overcoated Houses," by Ernest McCullough of Chicago; "Cement Street Paving," by C. M. Thorpe of Bozeman, Mont.; "Small Cement Houses," by C. D. Warner of Chicago; and "Good Roads and How to Get Them," by H. H. Gross of Chicago, American representative at the International Conference on Good Roads, held at Paris last October.

At the annual meeting of the Cement Products Association, held March 4, the following officers were elected for the ensuing year:

President........Martin T. R. Roche of St. Paul.
Vice-Presidents... Lee Stover of Watertown, S. D.
A. H. Laughlin of Lisbon, N. D.
L. V. Thayer of Minneapolis.
William Hurst of Glendive, Mont.
Secretary........J. C. Van Doorn of Minneapolis.
Treasurer....... J. M. Hazen of Minneapolis.

The Cement Tile Manufacturing Association at the annual meeting, held March 3, elected officers as follows:

President......L. L. Bingham of Estherville, Iowa.
Vice-President. D. C. Keith of Ceylon, Minn.
Secretary...... C. E. Sims of Worthington, Minn.
Treasurer......G. F. Keil of Shurburn, Minn.

Building figures for February show a marked falling off as compared with the corresponding month of last year, the permits being 202 and 234, respectively. The estimated cost of new buildings authorized last month amounted to $300,745, as compared with $356,795 in February, 1908, and $798,835 in February, 1907.

The indications are that the master builders and the union men will experience more difficulty than usual in effecting their annual agreement. The fact that union carpenters in Minneapolis draw 42½ cents an hour, or 2½ cents less than the union scale in St. Paul and Duluth, has led the local men to demand an advance. The master builders on their side have made an agreement among themselves to come out for the "open shop" in case the union carpenters insist on their advance.

Work on the proposed Armour packing plant at New Brighton, a suburb of northeast Minneapolis, is reported to be due to begin within the next six weeks. The Armour Company has already purchased a tract of 1600 acres and is planning the erection of the most complete packing plant in the world. J. Ogden Armour, president of the company, has recently announced that the project will involve the expenditure of $3,000,000 within the next five years. The tract has already been laid out, and permission has been granted by the City Council of Minneapolis to lay water and gas mains, sewers, electric wire and telephone conduits, and provide for electric and steam trackage.

New York City.

The rush to file plans of buildings in anticipation of the adoption of a revised building code for Greater New York is strikingly reflected in the permits issued last month by the Bureau of Buildings and the comparison which the figures make with the same month a year ago. In the Borough of Manhattan the total estimated cost of the new work for which permits were issued is placed at $15,468,000, while in February last year the estimated cost of the new work was only $942,550. In the Borough of the Bronx the same general conditions have prevailed, and the estimated cost of the new building improvements is given at $4,100,000, as against $354,000 in February, 1908. This gain for a single month, as compared with the corresponding period of the year before, is probably without a parallel in the history of the city, and is accounted for in large measure by the fact above stated.

In Brooklyn the percentage of increase is not so marked, although February showed a very gratifying increase over the same month last year, the figures being $2,313,000 and $1,423,372, respectively.

With the large number of improvements already projected there would seem to be every reason to expect a degree of activity the coming season which would be fully up to the average and give employment to many now idle mechanics in all branches of the trade.

The select committee of the Board of Estimate and Apportionment on hight of buildings is opposed to restricting the hight of skyscrapers, although it favors certain restrictions regarding the angle of light.

Newark, N. J.

The amount of new work projected during the month just closed was of a nature to warrant optimistic views as to the building season about to open. The monthly report of Superintendent of Building William P. O'Rourke shows that 156 permits were issued in February for building improvements estimated to cost $495,844, while in February last year 123 permits were taken out for buildings costing $271,901.

Philadelphia, Pa.

The opinion that a substantial recovery in the building industry would be noted early in 1909 appears to be pretty well borne out by the statistics showing the volume of business undertaken during February. From the data compiled by the Bureau of Building Inspection it is to be noted that 566 permits for 1049 operations at an estimated cost of $2,141,280 were issued, which shows a gain of nearly 75 per cent. when compared to the business done during the same month last year. In fact, in no other year during the past decade, except in 1906, has the volume of business undertaken during the month of February exceeded that of the past month. There was a marked increase in dwelling houses during February when 525 operations at an estimated cost of $1,060,830 were begun. This shows an increase of over $650,000 in value when compared with the value of work of the same class during the preceding month and an increase of over $950,000 when compared to the volume of work begun in dwellings during February, 1908. The records of the bureau show that outside of dwelling operations work was begun on two school houses for the city to cost about $200,000, while $65,000 will be spent on manufactories and $55,800 on workshops.

It is now confidently believed that the trade will continue to improve steadily, and that the year will be fully up to if not exceed the normal.

Rochester, N. Y.

A marked improvement was noted last month in the amount of new work for which building permits were issued by the Building Bureau. The greatly increased total as compared with February a year ago is due in goodly measure at least to the fact that the permit granted for the erection of J. H. Moore's new theatre in Clinton avenue, South, is included, this calling for a structure estimated to involve an expenditure of $250,000. Another important operation projected last month is the new plant of the John Hoffman Mfg. Company, which is estimated to cost in the neighborhood of $45,000. Then again a block of stores and offices in Monroe avenue calls for an outlay of $20,000, thus accounting for a little over $300,000 out of a total of $519,530 for the entire month. These latter figures compare with $81,815 as the cost of building improvements projected in February, 1908, thus making the percentage of gain this year over last phenomenal. In the lists of permits for dwellings there is an uuusually large percentage, covering extensive remodeling of present homes.

San Francisco, Cal.

During February heavy rains continued to hold back building in this city to a very large extent, and it was not until the latter half of the month that much progress could be made in outside work. There was, however, a fair amount of new work contracted for, and the permits issued showed an increase over the record of the months preceding. The total value of the permits issued during February was $2,296,109, as compared with $2,166,309 for January and $1,853,542 for December.

Builders are inclined to think that the spring and summer will be chiefly notable for the building of two and three-story flats and of three and four-story frame apartment houses. These are being erected in that part of the burned section not included in the fire limits. Builders have not yet been able to devise a sort of building which will satisfy the construction requirements inside the fire limits and at the same time be economical enough for the hilly section of the city. The hilly section north of Market street was formerly covered with frame apartment houses, flats, &c., and though the building law now forbids frame construction in this district, owners do not feel justified in erecting business blocks. Some builders are inclined to think that this territory will eventually be covered with brick apartment houses, hotels, churches and other semipublic buildings of the better sort.

Portland, Ore.

Weather conditions were more favorable in Portland during February than during the month previous, and the building record responded. During the month just closed a total of 322 permits were issued with a total valuation of $1,328,540, or more than three times the valuation of the permits issued in January. As compared with February, 1908, the gain is almost half a million dollars, and as compared with February, 1907, the gain is $450,000. The work undertaken during the month just closed included a large proportion of brick, concrete and frame business blocks, as well as a large amount of residence building. The brick construction included 14 buildings to cost $393,950; the concrete construction four buildings to cost $455,350, and the frame construction 15 business blocks to cost $70,050, and 111 residences to cost $340,000.

February was also a fairly good building month in the matter of actual as well as projected construction, and most of the workmen in the city are now at work. Builders anticipate an active spring and summer.

Seattle, Wash.

Notwithstanding the fact that there was one day less in February this year than a year ago, the amount of new work projected in the building line showed a marked increase as compared with February, 1908. The figures compiled in the office of Superintendent of Buildings Francis W. Grant shows 1022 permits to have been issued for improvements estimated to cost $1,152,155, whereas in February last year 909 permits were issued for improvements involving an estimated outlay of $642,580. February this year, however, showed, as compared with January, a slight increase in the number of permits issued, but a marked decrease in the value of the contemplated improvements, the figures for January being 918 permits for new buildings, alterations, repairs, &c., involving an outlay of $2,071,965.

Of the total for last month, 139 permits cover frame buildings intended for business purposes and involving an outlay of $341,385, while 302 permits cover frame residences estimated to cost $576,245. There were five permits for brick construction involving an estimated outlay of $123,200, which latter figures, by the way, contrast with $513,000 for brick construction in January.

St. Paul, Minn.

The feature of the month in the building line has been the marked increase in the demand for materials used in heavy construction. The result has been a brisk trade in brick, stone, cement and other heavy materials, with a corresponding advance in the price of them all. Brick, especially, has shown the effect of the quickened demand, and dealers are predicting a speedy reaction from the dull conditions that have prevailed for nearly two years. Cement also shows a marked tendency to bring a stronger price, notwithstanding the fact that several new concerns have invaded the local field during the past few months. The largest contract for cement construction in the history of the city has just been let by the Soo Railroad Company in the shape of a 1200-ft. tunnel through the bluffs of the city. This fact, together with the probability that cement will figure largely in the construction of the new terminal buildings that the company will erect in conjunction with the tunnel has had the effect of boosting the price of cement forthwith.

Permits issued from the building inspector's office during February aggregated 184, against 109 for February last year, and the estimated cost of the work was $375,032, as compared with $168,732 in February, 1908.

Two ordinances recently passed by the City Council require that work on a building is not to begin until a permit is taken out, and also that the plans for a building be submitted to the building inspector for examination before the permit is granted.

There seems to be little prospect of labor difficulties this spring. The unions have no serious demands to make, and the master builders are disposed to grant what few demands their men wish. The building prospect is so bright that neither side is inclined to compromise the situation with a labor war, and the several semipublic bodies, like the Commercial Club and the Real Estate Board, are on the lookout to stave off any trouble that may arise. The demand for labor will far exceed that of the two preceding years.

Worcester, Mass.

The members of the Builders' Exchange enjoyed their twenty-first annual banquet at the State Mutual restaurant on the evening of February 19, covers being laid for about 200. Prior to the banquet a reception was held in the rooms of the Commonwealth Club, where members and guests enjoyed a social hour. Shortly after 7 o'clock the strains of Truda's orchestra ushered the company into the banquet hall. President E. D. Ward of the local exchange presided and Burton C. Fiske was toastmaster.

After the many good things provided by the Banquet Committee had been duly considered, Toastmaster Fiske in a few well chosen words introduced the various speakers of the evening. Mayor Logan was first called upon, and his remarks were received with prolonged cheering. John L. Sewell, secretary of the Board of Trade, spoke briefly of the remarkable growth of that organization, and he was followed by Walter Drew of New York, commissioner of the National Steel Erectors' Association, who took for his topic "Labor and the Law." His remarks were followed with close attention by all present. J. P. Bird, also of New York, and manager of the National Association of Manufacturers, spoke on "Industrial Defense," his comments being accompanied by many a humorous story.

The Banquet Committee was composed of E. D. Ward, chairman; A. P. Robbins, G. W. Carr, Elwood Adams, J. J. Higgins, H. C. Wilson, O. S. Kendall, B. F. Marsh, G. E. Brigham, R. G. Cleveland and H. W. Sweetser, secretary of the exchange.

Youngstown, Ohio.

At a meeting of the Builders' Exchange Tuesday evening, January 12, the Board of Directors organized by electing the following officers for the ensuing year:

President...............J. L. Dalzell.
Vice-President...........J. E. Nutt.
Treasurer...............W. J. Scholl.
Secretary.............. W. F. Merrian.
Acting Secretary.........George H. Coller.

Notes.

There has been more activity in the building line in Marquette, Mich., this past winter than is usual at this season of the year. A considerable number of dwellings are under construction and the majority of the carpenters of the city are steadily employed. One reason given for the unusual amount of building is the price of lumber, which is lower than for several years past.

LAW IN THE BUILDING TRADES.

BY A. L. H. STREET.

RIGHT TO MECHANICS' LIENS.

WHERE the expenses of a mechanic's lien foreclosure were due mainly to the resistance of the contractor, the equity court had the right to impose the costs upon him.

An allowance of interest is proper in a mechanic's lien foreclosure if the amount due is capable of ascertainment by mere computation.

Double cases with shelves, exhibition cases, partition base, cupboards, a platform, lockers, dressers, bulletin boards, and supply cases in a building designed exclusively for a public library, constructed from the same wood as the finish of the rooms in which installed, and fitted to them, and fastened by holdfasts, nails, screws, angle irons and the like, and without which equipment the building could not be used for library purposes, were an improvement of the realty protected by a mechanic's lien.

Where a building contractor contracted with a certain corporation as owner of the premises, and in response to an inquiry by a subcontractor as to who was the owner informed him that such corporation was on the building permit, such building contractor was estopped to deny the ownership of the corporation as against the subcontractor in an action to foreclose his mechanic's lien.

A subcontractor's lien is not dependent upon the principal contractor obtaining an architect's certificate.—(Appellate Division, New York Supreme Court) Rieser *vs.* Commeau, 114 N. Y. S., 154.

Failure to comply with labor law (Laws 1897, p. 468, c. 415), section 20, as amended by Laws 1899, p. 350, c. 192, providing that the contractor or owner of a building in course of construction shall inclose the elevator shaft, on each floor, was not the cause of the injury, and so does not authorize recovery where, as an employee of the contractor was removing a wheelbarrow from the elevator, on the ninth floor, and while he was still on the elevator, the elevator suddenly descended to the fourth floor, when it was suddenly stopped and the employee was thrown off and into the cellar.

For the purpose of carrying up building materials in a building in the course of construction, there was installed by P., under contract with V., a contractor for part of the work on the building, elevators under the charge of one of P.'s engineers. P., by its contract, furnished the engine and elevators and the engineer to operate them, for which it received payment from V. Held, that the engineer was not the servant of V., so as to render it liable for his negligence, though under said contract his time was kept by V. and turned over by it to P., and after P. had paid him for his services, according to the time so reported, V. repaid P. the amount so paid.—Appellate Division, New York Supreme Court) Genovesia *vs.* Pelham Operating Co., 114 N. Y. S., 646.

A submission of bids by contractors to build a house for a certain sum, not including the foundation, in response to a written notice by the owner that he proposed to build, was an offer by the contractors to erect the building for that sum. Defendant's remark to plaintiffs, upon opening the bids received after notifying plaintiffs and other contractors of his intention to build, "I guess it is up to you. Yours is the lowest bid"—was an acceptance of plaintiffs' bid. Where defendant unconditionally accepted plaintiffs' offer to erect a building at a certain price, he could not thereafter require that the contract provide that the material be purchased from a particular firm; the contract being then completed.—(Texas Court of Civil Appeals) Lane & Nearn *vs.* Warren, 115 S. W., Rep. 903.

PREVENTION OF PERFORMANCE.

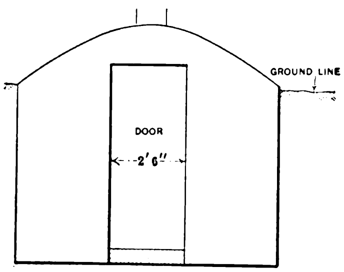
Minor defects and omissions in a structure, if not willful, do not prevent recovery by the contractor as for a substantial performance, where the owner receives benefits under the contract, since the owner may recoup his damages.

Where a building contract provided that, if the work be destroyed before completion, the loss should be borne by the owner to the extent of accrued installments, and the building was destroyed before it was accepted, and when it had been completed except the laying of stone work for floor entrances, the cost of which would be $39, the contractor could not recover installments payable on the completion and acceptance of the building; the doctrine of substantial performance not applying.

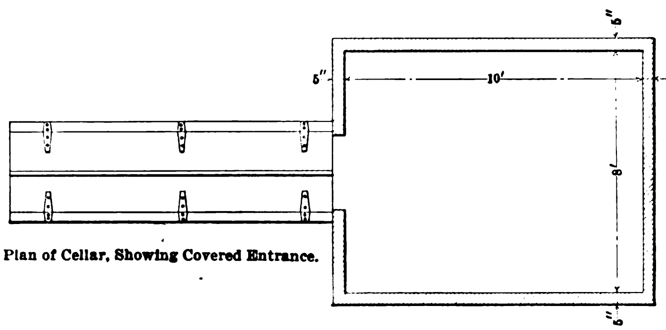
A building contractor cannot avoid a provision in the contract depriving him of installments which have not accrued at the destruction of the building by showing that completion of the building was delayed by the acts of another contractor.—(California District Court of Appeals) Seebach & Kuhn, 99 Pac., Rep. 723.

A Concrete Cyclone Cellar.

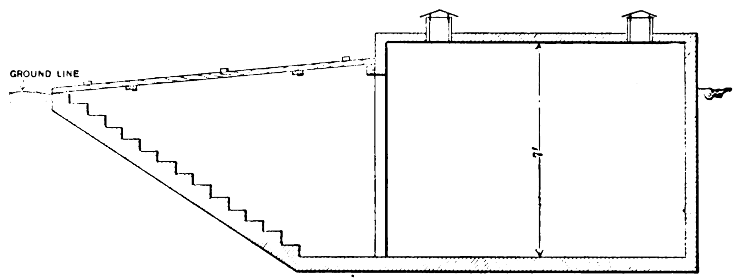
In many sections of the West and Southwest, especially where cyclones are not an altogether uncommon occurrence, cellars or retreats for farmers and their families are usually constructed so as to be readily accessible when one of those wind destroying storms occur. The cellars are also utilized in the case of prairie fires, which occasionally sweep over large sections of territory. The only sure salvation for the inhabitants of a community where such occurrences are frequent is to get below ground, and in order to render the cyclone cellars storm and fire proof they are now being constructed of concrete. In cases where concrete is used as the building material there is no danger of the roof blowing off or of the walls decaying in the course of a few years and having to be renewed. The illustrations which we present herewith represent elevations and sections of a concrete cyclone cellar and are reproduced from a late issue of *Concrete Review*. The illustrations so clearly show the general arrangement of the cellar that extended comment would appear unnecessary.



Front Elevation, Showing Entrance to Cellar.



Plan of Cellar, Showing Covered Entrance.



Longitudinal Vertical Section of Cellar.

A Concrete Cyclone Cellar.

Clay Products Laboratory of the United States Geological Survey.*

The following extracts are from an address on the above subject delivered before the National Association of Brick Manufacturers, at their convention in Rochester, February 4, by A. V. Bleininger, ceramic chemist, United States Geological Survey:

With the constantly increasing importance of clay products as a structural material, and in view of the fact that the Government spends about $40,000,000 annually in construction work, Congress authorized the prosecution of testing work upon all building products made from clay used by the Federal Government. This step was especially timely owing to the growing scarcity of timber and the enormous fire losses of the country. The Federal engineers realize more than ever before the need for more definite knowledge concerning the fire resisting properties of structural materials. Since the primary object of the new section is the testing of clay products used by the Government, it is evident that the specifications governing the purchase of the various classes of materials must be worked out carefully, so that they are fair to the manufacturer as well as to the Government, resulting in the purchase of ware of good quality. In this manner it is intended that the Clay Products Section should test common and pressed brick, fireproofing, terra cotta, floor and roofing tiles, hollow tiles and conduits, sewer pipe, enameled bricks and glazed tiles, firebrick and all other refractories, electric porcelain insulators and other structural goods submitted for this purpose by the construction bureaus of the Government. It is readily seen that the study of the methods of testing these various products of clay requires a great deal of work and detailed attention, and this part of the activity of the Section must always be pre-eminent.

A great number of problems relating to the testing of clay wares might be mentioned. I shall state but a few. What shall constitute the minimum crushing strength of a good, common brick; relation between porosity and crushing strength; relation between porosity and resistance to freezing; relation between permeability and resistance to freezing; relation between density and resistance to sudden heating; crushing strength of firebrick at high temperatures, and heat conductivity of burnt clay wares; strength of hollow tile walls, arches and columns, as well as strength of terra cotta of various shapes.

Outside of this definition of the working scope there is a great field open along the line of aiding in solving manufacturing problems more or less directly connected with the testing of the quality of clay wares for various purposes. In other words, the second part of the duties of the Section would consist in assisting the manufacturers to reach the highest possible grade of quality. This again opens up many problems for investigation.

As a third field of activity the Section has in mind the study of the clays of the country with special reference to the deposits found on the public land. Here again an exceedingly great number of problems remain to be solved. It is surprising how little we know about clays, a fact which we see borne out every day by the failure of this or that concern due to the use of improper materials. Since we have to-day no standard methods for the testing of clays, the matter of the selection of proper clay materials must continue to be an empirical procedure depending upon individual experience and judgment. Nobody can deny that this is an extremely important subject and should receive proper attention.

During the St. Louis Exposition some work was begun by the Government under the direction of the United States Geological Survey, on the investigation of the coals of the country. Somewhat later this work was extended to various other investigations, and among them to the study of concrete. At the present time all of this work is gathered together under the name "Technologic Branch," and it embraces numerous divisions of research.

In the fall of 1908 the various sections were moved to Pittsburgh, and through co-operation with the War

* Published by permission of the Director of the United States Geological Survey.

Department they were enabled to occupy the buildings and grounds of the United States Arsenal. In the buildings now available there are housed the divisions of mine accidents and explosives, fuels, lignite briquetting, concrete and stone, and clay products.

The concrete section is engaged in the study of the various uses of this material, with special reference to the study of the various aggregates and the fundamental properties of plain and reinforced beams and columns, work which is being carried on with care and thoroughness.

The clay products section laboratories occupy nine rooms in building No. 10, which are equipped with grinding pans, screens, ball mill pulverizers, auger machine and cutting table, repress steam and gas heated dryers, dry press, filter press, brick rattlor and all of the apparatus needed for the physical and chemical study of clays. A commodious brick structure with a 60-ft. stack contains the kilns and furnaces which are used for making burning tests. Draft gauges and gas analysis apparatus are provided for controlling the operations. For carrying on crushing, transverse and tensile strength tests the structural materials division has available all of the necessary machines, and it has under construction probably the largest testing machine in the world with a capacity of 10,000,000 lb. This machine will render possible the carrying on of tests on brick piers up to 60 ft. high, and has ample range for all kinds of beam and column work in clay, concrete and structural steel. In addition, apparatus for making freezing and fire resistance tests and for high temperature work, such as electric furnaces, is provided.

The investigations now being carried on in the clay products laboratories are as follows: Study of the fundamental property of plasticity; relation between the crushing strength and the porosity of burnt clay products; the crushing strength of firebrick at high temperatures; the resistance of soft mud, stiff mud and dry pressed brick of from high to low porosity to sudden temperature changes; the effect of longer and shorter burning upon the clay ware.

New Publications.

The New Building Estimator. By William Arthur. Size, 4¾ x 6¾ in.; 240 pages. Bound in board covers with side and back titles, rounded corners. Published by the David Williams Company, 14 and 16 Park place, New York City. Price, $2.50, postpaid.

This will be found a most valuable and instructive work for the progressive and up to date carpenter and builder, consisting as it does of a practical guide to estimating the cost of labor and material in building construction, covering the ground from the excavation for the cellar to the completed structure. Various practical examples of work are presented in detail, the labor being figured for the most part in hours and quantities.

The present is a revised edition and the outgrowth of what was "The Building Estimator," first published in 1904. The revised edition has been further enlarged, prices brought up to date and much new tabulated matter inserted. Another feature which cannot fail to appeal to those who occupy the long winter evenings for study is the fact that the entire work has been set throughout in new type and arranged in most attractive shape. In the preparation of the book the author has not only drawn upon his own wide experience as an estimator and superintendent of construction, but he has obtained from others well qualified to furnish the information, data on quantities and costs pertaining to a great number of representative structures, both large and small.

The work is comprised in 29 chapters, subdivided by cross headings into the numerous phases of the subjects discussed. The matter has been arranged with a great deal of care and attention to detail, and the whole is presented in such shape as to be of great help to all connected with the building industry and a valuable adjunct of the library of trade literature of the architect, the builder and the contractor.

American Competitions, Volume II. Edited by Adin Benedict Lacey, architect. Illustrated by more than 40 sets of drawings, including over 250 half-tone plates of plans, elevations, sections and details, the plates measuring 11 x 14 in. and 14 x 22 in. Published by the T Square Club, Philadelphia, Pa. Price in green buckram binding, $15; half morocco binding, $16.50.

The favorable reception of Volume I of this work has encouraged the T Square Club to continue the publication, the usefulness of which to the architect, the draftsman and the student cannot be overestimated. It is a compact record of important contemporary American architecture and a partial list of contributors including the very best talent in the country. The edition is limited to 700 copies, all laced binding, each plate on hinge, so that the book will open flat.

Detached Dwellings, Country and Suburban. Size, 9 x 12 in. Substantially bound in board covers. Published by the Swetland Publishing Company. Price, $5.

This is a work which will be found of much interest and value to architects throughout the country, containing as it does an excellent collection of illustrations embodying a great variety of modern architectural studies in the shape of up to date dwellings which have actually been erected by prominent architects in various sections of the country, and which have appeared in the *American Architect* during the last few years. The half-tone illustrations are accompanied by floor plans accurately drawn to scale, while the collection of plates is prefaced with a two-part article by Wilson Eyre on "The Planning of Country Houses."

In addition to the half-tone illustrations and floor plans are a number of pen and ink sketches all exhibiting clever treatment of the subjects under consideration. A striking feature of the collection of designs is the variety of interiors and doorways presented, the whole making a comprehensive exhibit of the work of men who do things well.

This collection of nearly 100 examples of modern homes differs from others of a similar nature in that it represents the work of a large number of architects who have made a specialty of "detached houses" and have achieved great success in that line.

Artistic Use of Field Stone in Dwelling Construction.

The use of field stone in country house building is practically as old as the country, and the instances are many throughout New England, Maryland and Virginia and the environs of Philadelphia where the stones were literally taken from the fields and utilized in the construction of farm houses and barns. But to-day the fields are cleared and the stones we build with are found mostly in the fence walls where the farmers for generations back have piled them, says a writer in a recent issue of the *American Architect*. Some localities are especially rich even to-day in these fence walls of weathered stone. The long, flat stones that admit of a natural bond are the best for building purposes.

We have happily passed, and it is to be hoped for good, through the "cobble stone era," that period when the suburban home builder obtained those fearful results we frequently see in almost every suburb, in his attempt to build a wall out of the round field stone which only holds together by the sheer adhesive power of cement.

They have, however, a curious interest in themselves, for they are undoubtedly a product of glacier period, having been worn to a smooth surface by centuries of travel. By their very shape, however, let alone their texture, they are no more adapted to building purposes in a wall than so many large sized marbles.

On the other hand, excellent results can be obtained by the use of flat stones when properly laid.

It is, however, no simple task to obtain this result. In the first place, the longest and flattest stones should be selected, and set aside to be used in the construction of arches—flat headed or round. Then the second gleaning of all the possible stones to be used for the face work should be made, and with this, as with the arch stones, a care that is nigh to tenderness must be utilized in the handling.

For it must be remembered that the undisturbed weather surfaces only are to be exposed in the wall, and if the stones can be laid with the moss, which often covers them, still clinging, the effect of an old wall is naturally enhanced.

Even at the expense of ridicule, one should insist upon an old quilt or rags being laid on the stone boat or wagon used to haul the stones; and then with the utmost care in handling, a wall may be laid with every stone on the face a weathered stone, and the result will be a wall that resembles a building which has faced the storms of a century.

But it is the horizontal laying that is most important after the stones are safely at the site. Regularity in size should be avoided, and every stone should be laid on its natural bed flatly. The weathered face can be backed up with the refuse of the stone walls, quarried stone or even brick.

As to the jointing and pointing, the large joint with the mortar kept well back is most effective, and a white mortar for the pointing is essential if the building is designed in the Georgian period, where the exterior woodwork is white. Even where the building may be trimmed with stained chestnut, the weathered faces of the stones appear so dark in the finished wall that the white joint seems most effective.

It is interesting to note in building from the stones of these old fence walls how many feet of wall even a small building will consume if the stones are selected with the care we have indicated. Many are the cases we have known where an owner who was confident that he had more stone on his place than could possibly be used in the contemplated building has had to buy from the neighboring farmers.

Fireproof State Buildings.

In his annual report, submitted to the New York State Legislature on January 20, Franklin B. Ware, State architect, recommended serious consideration of the advisability of the State constructing its more important buildings of a fireproof character, and he also recommended a more uniform system of selecting architects by competition for State work. He points out in his report that the cost of rebuilding structures damaged or destroyed by fire during the last 8 or 10 years to have been over $1,000,000, and but a small proportion of this amount to have been covered by insurance. The cost of fireproof buildings will exceed, he states, the cost of non-fireproof structures by about 20 per cent. The cost of maintenance on buildings at the various institutions due to ordinary wear and tear and deterioration is appreciable, and much of this expense might be saved by adopting fireproof construction.

Regarding competition among architects for State work the report says:

"A general law should be passed containing the provisions that all competitions shall be held only when recommended by the State architect, with the approval of the Governor; that the rules and regulations governing competitions should be prepared by the State architect, and that the Board of Award should be composed of men capable of passing on the architectural as well as the practical features of the design. Practically all of the best architects in the country are members of a society that has formulated a code for the conduct of competitions, and if the State expects to obtain the best services of these men by competition the conditions should be drawn up so as not to conflict with the code, except as its provisions might conflict with the State laws."

The eleventh annual dinner of the Architectural Alumni Association of Copper Union was held the latter part of January, at the Hotel Brevoort, Fifth avenue and Eighth street, New York City. An elaborate menu was served, at the conclusion of which toasts were responded to by E. A. Miller, chief engineer of the New York City Park Department, on "Cooper Union"; G. W. Taylor of McMann & Taylor, "Peter Cooper"; August Canziani, "The Alumni" and William McKeiver, "Patriotism," and many others. The guests numbered 82. George V. Greey, the retiring president, acted as toastmaster. Officers elected for the ensuing year were: August Canziani, president; William H. Wagner, vice-president; J. T. Suppes, treasurer; James A. Milham, recording secretary; J. F. Rogers, corresponding secretary.

Another old landmark in the way of a well-known hostelry in New York City is about to be replaced with a modern commercial building, which will involve an expenditure closely approximating $1,000,000. The new structure will rise on a site at the northwest corner of Irving place and Sixteenth street, where now stands the Westminster Hotel, erected when the neighboring Union square and all its abutting streets were occupied by fashionable private residences. The new building will be 11 stories in hight and of Italian Renaissance design, the two top stories having a loggia with Doric collonnades. It will front 148 ft. on Irving place and 225 ft. on Sixteenth street. The structure will be known as the Borgfeldt Building, the plans for which have recently been filed by Architect James Riley Gordon of 402 Fifth avenue, New York City.

CONTENTS.

Carpentry and Building

NEW YORK, MAY, 1909.

Competition in Modern Bungalows.

SECOND PRIZE DESIGN.

ACCORDING to the announcement made in our last issue the committee having charge of the Competition in Bungalows not to exceed in cost more than $3000 in that part of the country from which the drawings were sent, awarded the second cash prize to the study contributed by W. H. Higginbotham, formerly of Hopkinton, but now located at 353 Walnut street, Yonkers, N. Y., and we have pleasure in presenting it herewith for the consideration of our readers. It is designated by the author as an "Adirondack Bungalow," and even a casual inspection of the pictures will show its style to be well adapted for the mountains or the lake, while at the same time it is of a character to render it habitable the year round if desired. The front and side elevations also convey an excellent idea of the appearance of a bungalow of the log cabin style, and the quaint and artistic effects which may be produced by the utilization of materials usually found close at hand in mountainous sections.

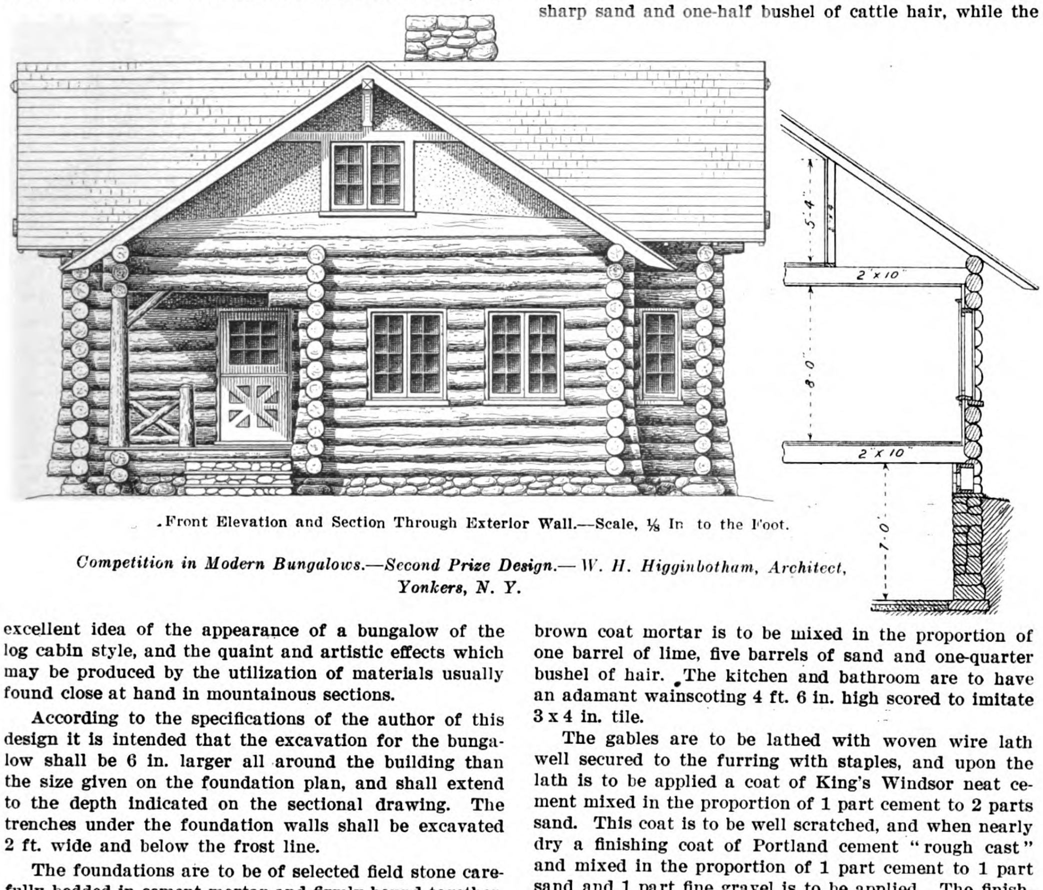
According to the specifications of the author of this design it is intended that the excavation for the bungalow shall be 6 in. larger all around the building than the size given on the foundation plan, and shall extend to the depth indicated on the sectional drawing. The trenches under the foundation walls shall be excavated 2 ft. wide and below the frost line.

The foundations are to be of selected field stone carefully bedded in cement mortar and firmly bound together. All walls and piers are to have sound footing stones 6 in. thick, 24 in. wide and 3 ft. long. The foundation wall above grade as well as the chimney above the roof and the foundation for the front steps are to be of selected field cobblestone laid as above stated and neatly pointed with cement mortar colored with lampblack.

The cut stone for the front steps, cellar and window sills as well as the stone flagging for the cellar is to be of Fort Jackson quarry stone free from flaws and delivered at the building by the stone cutter.

The brick for the chimney and the backing for the fireplace is to be common red brick, while the brick for the fireplace in the dining room, hearths and breast in the kitchen are to be of selected red brick. All red brick are to be laid up in lime mortar made in the proportion of 2 parts clean sharp sand and 1 part good lime. The fireplace is to be lined with firebrick laid up in fireclay. Each flue is to have an 8 x 8 in. cast iron cleanout door near the bottom.

All log work is to be pointed by the mason in a neat manner with cement mortar colored with lampblack. All walls and ceilings are to be covered with No. 1 spruce lath, the joints being broken every eighth lath. All angles and corners are to be built solid, and the lath is not to run from one room to another behind the studding. A scratch and a brown coat of mortar are to be applied, the scratch coat mortar being mixed in the proportion of one barrel of lime, three barrels of plain sharp sand and one-half bushel of cattle hair, while the brown coat mortar is to be mixed in the proportion of one barrel of lime, five barrels of sand and one-quarter bushel of hair. The kitchen and bathroom are to have an adamant wainscoting 4 ft. 6 in. high scored to imitate 3 x 4 in. tile.



Front Elevation and Section Through Exterior Wall.—Scale, ⅛ In. to the Foot.

Competition in Modern Bungalows.—Second Prize Design.— W. H. Higginbotham, Architect, Yonkers, N. Y.

The gables are to be lathed with woven wire lath well secured to the furring with staples, and upon the lath is to be applied a coat of King's Windsor neat cement mixed in the proportion of 1 part cement to 2 parts sand. This coat is to be well scratched, and when nearly dry a finishing coat of Portland cement "rough cast" and mixed in the proportion of 1 part cement to 1 part sand and 1 part fine gravel is to be applied. The finishing coat is to be colored with mineral mortar stain to harmonize with the logs.

The specifications accompanying this Adirondack bungalow continue as follows:

Carpenter Work.

Framing.—All framing timber to be of No. 1 spruce. Must be framed and constructed according to drawings and sections.

	Dimensions. Inches.	Inches on centers.
First-story joists	2 x 10	16
Attic joists	2 x 10	16
Ceiling joists	2 x 6	16
Collar ties	2 x 4	20
Rafters	2 x 6	20
Valley rafters	2 x 8	..
Partition studs	2 x 4	16
Bridging	1 x 3	..
Girders	8 x 8	..

Log Work.—Outside walls to be laid up of 10-in. spruce logs, sound and free from loose bark. All corners to be laid up, as shown on drawings, in a neat and workmanlike manner. Joints between logs must not be over ¾ in.

Frame floor joists into the logs, as indicated on sectional drawings.

Partitions.—All partitions throughout the building to be set according to plans. Bearing partitions on first floor must foot upon girders below.

Sheathing.—Cover all gables with ⅞ x 8 in. spruce shiplap, nailed with two nails on each bearing.

Cover same with one thickness of rosin sized paper; furrow with ¾ x 1 in. furring to accommodate wire lath.

Subfloors.—Cover all joists on first floor and attic with ⅞ x 8 in. shiplap laid diagonally, nailed with two 8-penny nails on each bearing and strained up tight.

Roof.—Cover all roof surface with 1 x 2 in. spruce furring, spaced 5 in. from center to center and firmly nailed. Cover same with XXX cedar shingles 18 in. long, laid 5 in. to the weather.

Cornices.—All cornices to be timber finish, as per detail, with 2 x 4 in. false rafters, planed on three sides and frames as shown on sectional drawings.

Barge boards to be of 2 x 8 in. spruce planed and framed as shown.

Porches.—Build porches as shown, with rustic columns and balustrade. All porch floors to be laid in white lead of 1⅛ x 3 in. spruce flooring.

Ceil with ½ x 3½ in. double beaded yellow pine ceiling, blind nailed on each bearing.

Window and Door Frames.—Cellar frames of 1⅜ in. white pine, bedded on stone sills and fitted with staff mold and sash. All casement window frames to be made, as shown on detail, of white pine 1¼ in. rabbited jambs and fitted with 1¼ x 1⅛ in. staff mold.

Door frames to be made of 1⅜ in. white pine rabbited jambs and 2-in. birch sills.

Sash and Glazing.—All windows, shown on plans, to have 1⅜-in. white pine sash glazed with No. 1 American glass 9 x 12 in. Hang each sash with 2 x 2½ in. loose pin butts.

Interior Finish.

All bedrooms, upper hall, reception hall, dining room and living room to be trimmed with kiln dried, plain red oak. Bathroom to be finished with kiln dried basswood. All other trim to be of yellow pine.

Stairs.—Build main stairs, as shown, of No. 1 red oak. Treads and risers to be tongued and grooved together. Strings housed, wedged and glued up in the best manner.

Cellar stairs to be built of yellow pine, 1⅛-in. treads and ⅞-in. risers. Allow for head room under pantry cubboards.

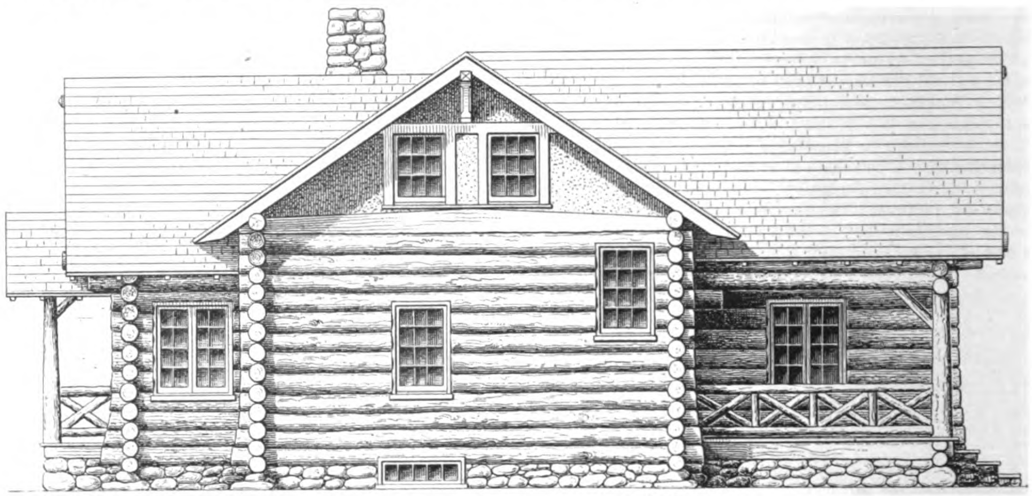
Pantry.—Fit up pantry with drawers, shelves and cupboards, where shown on plan, of yellow pine.

China Closet.—Furnish and set in place oak china closet, built according to detail.

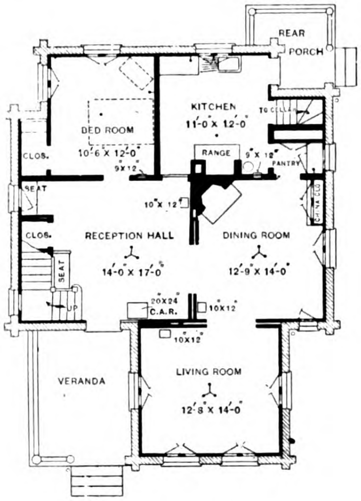
Mantel.—Furnish and set one oak mantel, built according to detail.

Closets.—Set medicine closet in bathroom, where shown on plans, 1 ft. 6 in. by 3 ft. and fit with necessary shelves.

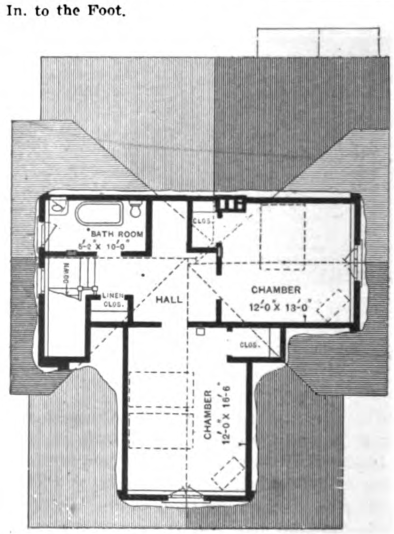
Furnish all closets with 12-in. shelves, where shown and 3½-in. hook rail on all sides.



Side (Left) Elevation.—Scale, ⅛ In. to the Foot.



First Floor.



Attic and Roof.

Scale, 1-16 In. to the Foot.

Competition in Modern Bungalows.—Second Prize Design.—Elevation and Floor Plans.

Picture Molding.—Put up in principal rooms on first floor and attic a 2-in. picture molding, 9 in. from ceiling.

Floors.—After all trim is in place lay ⅞ x 2½ in. No. 1 birch floor, with one thickness of rosin sized paper in all bedrooms, upper hall, reception hall, dining room, living room and bathroom.

All other floors to be of No. 1 yellow pine ⅞ x 3 in., with rosin sized paper underneath.

plates complete. Hang sliding doors with ball bearing tubular hinges, properly set with all fittings complete. Furnish casement windows with a good window lock of the same finish.

Painting and Finishing.

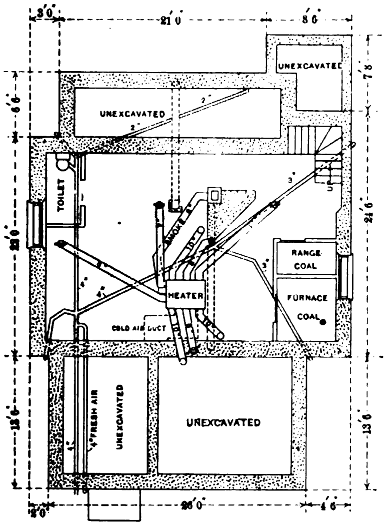
Exterior Painting.—Paint all exterior woodwork with two coats best white lead and linseed oil (except porch ceilings). Paint porch floors slate color, all other painted work to be white.

All knots and pitch places to be shellacked before painting. Putty all nail holes after first coat is dry.

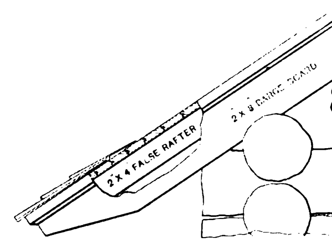
Dip all shingles two-thirds their length in Cabot's green creosote shingle stain.

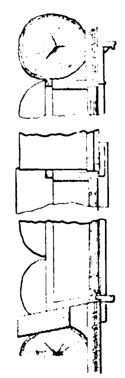
Finish porch ceilings with a coat of best liquid filler after dry, sandpaper lightly and varnish with one coat of best spar varnish.

Interior Finishing.—All oak trim to be finished with one coat "Johnson's paste filler," well rubbed and wiped

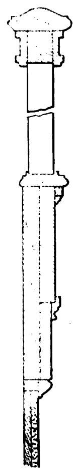


Foundation.—Scale, 1-16 In. to the Foot.

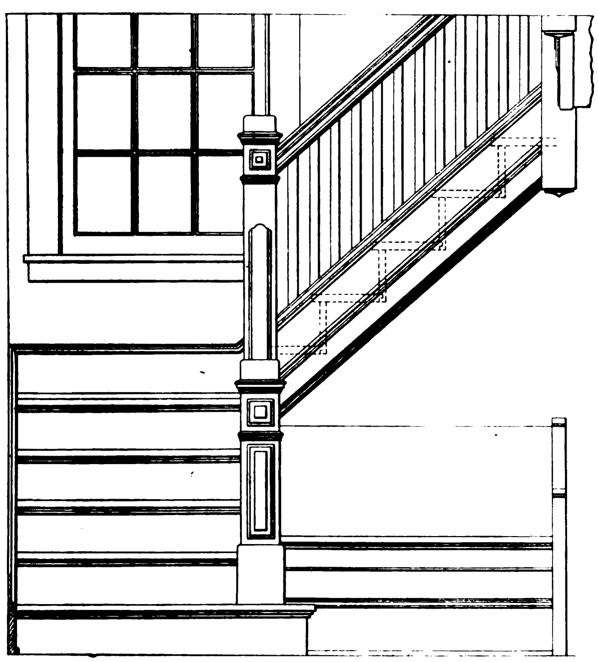




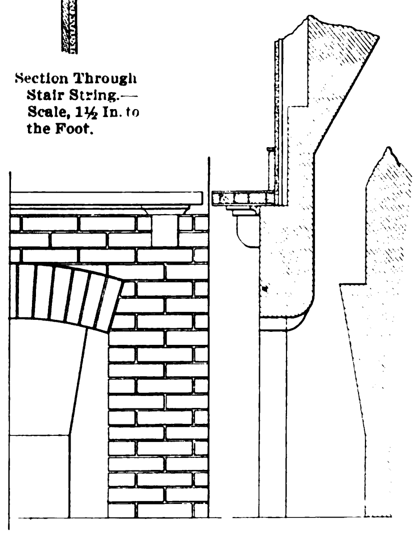
Details of Main Cornice and Section Through Casement Window.—Scale, ½ In. to the Foot.



Section Through Stair String.—Scale, 1½ In. to the Foot.



Partial Elevation of Main Stairs, Showing Seat.—Scale, ½ In. to the Foot.



Partial Elevation and Section of Fireplace in Dining Room.—Scale, ½ In. to the Foot.

Competition in Modern Bungalows.—Second Prize Design.—Miscellaneous Constructive Details.

Tinning.

Valleys.—Line all valleys with 14-in. tin, chimney and flanks to be flashed in the usual manner.

Grade all gutters to outlet and connect to drain with 3-in. galvanized iron conductors.

Hardware.

All hardware throughout the house to be of antique copper finish. Hang Dutch door with 4 x 4 in. loose pin butts. The remainder of the doors to be hung with 3½ x 3½ in. butts. Fit all doors with mortise locks, knobs and face off. After thoroughly dry, putty all nail holes with colored putty to match wood. Apply one coat best body varnish.

The remaining portion (except bathroom) to be finished with one coat liquid filler and one coat best body varnish.

Bathroom to be painted white, with two coats pure white lead and linseed oil paint, each coat to be sanded before next is applied. Finish with one coat of French zinc white, and spirits of turpentine.

All hardwood floors to be finished with one coat of "Johnson's wood filler" and one coat of floor varnish. The remainder of the floors to be filled and finished with a good coat of hard oil.

All metal work to be painted with two coats of best mineral paint.

Plumbing.

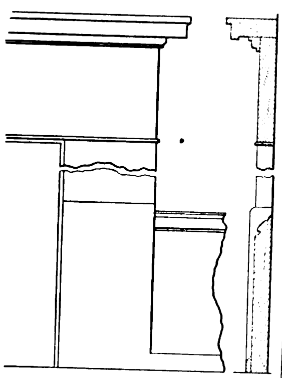
Drains.—Lay all drains from conductors with 3-in. cast iron soil pipe. Use 2-in. cast iron soil pipe to connect sink, washtubs and lavatory. All other soil pipe to be 4 in. All connections shall be made with Y branches. All joints in the cast iron pipe to be made with picked oakum and molten lead, calked in the best manner.

All connections between lead and cast iron pipe to be made by wiped solder joints on brass ferrules, calked in with lead and oakum.

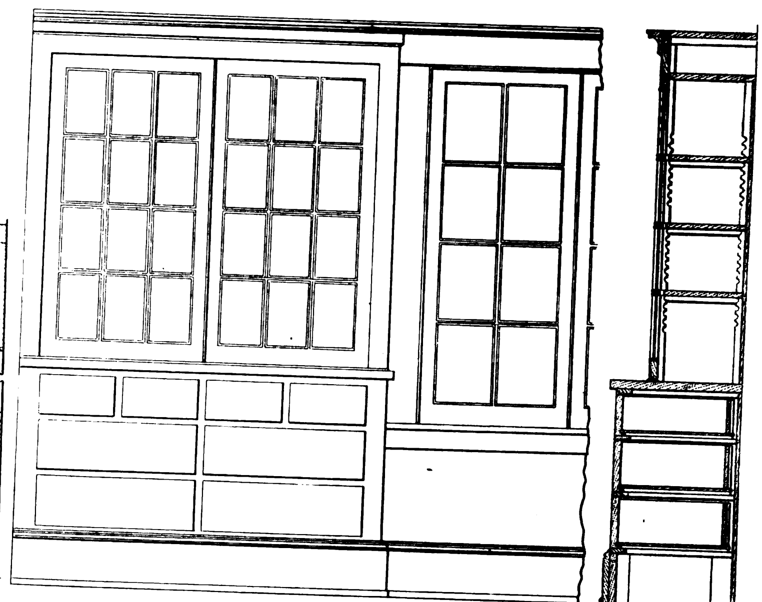
The plumber shall set a 4-in. cast iron running trap at point where soil pipe leaves house.

Put in fresh air inlet of 4-in. cast iron pipe and fit with a suitable cap.

Fixtures.—Furnish and set in bathroom, in attic, a low down siphon closet with oak seat and tank; connect same with soil pipe with lead bends and brass ferrule.



Details of Interior Trim.—Scale, 1½ In. to the Foot.



Elevation and Section of China Closet, with Partial Elevation of Dining Room Window.—Scale, ½ In. to the Foot.

Competition in Modern Bungalows.—Second Prize Design.—Miscellaneous Constructive Details.

Furnish and set in bathroom one 5 ft. 3 in. roll rim, cast enameled bathtub, with waste and overflow, hot and cold water supply through ½-in. N. P. brass pipes. Connect to soil pipe with N. P. brass trap in the best manner.

Furnish and set in cellar, as indicated on plan, one high tank front washout, water closet; connect to soil pipe as before described.

Furnish and set in kitchen one 18 x 30 in. cast enameled sink; connect to soil pipe with lead trap in the usual manner. Set one double washtub in kitchen, as shown on plan; connect with lead pipe and trap.

Furnish and connect to range coil one 35-gal. galvanized iron water boiler; range to be furnished by the owner.

Electric Wiring.

Furnish and put in electric wires throughout the house sufficiently large to carry the number of lights shown on plans. Lights in all principal rooms to have flush wall switches. All lamps to be 16 candle-power. Furnish and put in place a three-way switch in upper hall and reception hall. All wires, material and workmanship to be subject to test under the order of the local lighting company and of the National Board of Underwriters.

All fixtures to be of a neat design and finish to be of antique copper. All to be complete with lamps, shades and globes.

Heating.

Furnish and install on a foundation one No. 50 Hess Leader steel furnace and connect same with IX tin hot air pipes and 8-in. galvanized iron smoke pipe. All pipes to be fitted with suitable dampers.

All hot air pipes on first floor to be 10 in. in diameter (except kitchen and bedroom, which are to be 9 in.). All hot air pipes rising to attic to be 8 in. in diameter, stacks to be the usual size, 3½ x 13 in.

Cover all hot air pipes with asbestos.

All registers to be japan finish. Reception hall, dining room and living room to have 10 x 12 in. floor registers. Kitchen and bedroom to have 9 x 12 in. wall register. Place in reception hall, where shown, a 20 x 24 in. cold air register and connect same to furnace with galvanized iron air duct in the usual manner.

Place in front chambers an 8 x 10 in. floor register, where shown on plan.

In bathroom and in chamber over dining room 8 x 10 in. wall registers, as shown.

All above to be done in a workmanlike manner and guaranteed to heat the house in zero weather.

Furnace dampers to be so arranged as to be operated from first floor.

DETAILED ESTIMATE OF COST.

The estimate of cost of labor and materials accompanying the design awarded the second prize is as follows:

EXCAVATING.

Team work, 30 cents per hour; labor, 15 cents per hour.

	Rate.	Labor.
187 cu. yd.	$0.40	$74.80

MASON WORK.

Mason work, 30 cents per hour; helper, 15 cents.

	Price.	Amount.	Labor.
63 perch rubble masonry, chimney above roof included	$1.35	$85.05	$86.94
960 common brick	...	17.50	
150 firebrick	...	....	8.60
850 select brick	...	19.70	
40 yd. stucco for gables	.30	12.00	10.00
654 yd. lath and plastering	.30	196.20	153.98
2 stone window sills, 4 x 8 x ⅝	.50	1.00	.50
3 stone steps, 3 x 12 x ⅝	.60	1.80	.90
62 yd. flagstone floor in cellar	.90	55.80	11.16
Pointing joints in log work	...	10.75	12.60
	...	$399.80	$284.66

CARPENTRY WORK.

Carpenter work, 25 cents per hour.

	Price.	Mat.	Labor.
2240 L. ft. spruce logs	$0.125	$280.00	$145.60
225 bd. ft. 8 x 8 spruce, 14 ft. long.			
686 bd. ft. 2 x 10 spruce, 16 ft. long.			
782 bd. ft. 2 x 10 spruce, 14 ft. long.			
1080 bd. ft. 2 x 10 spruce, 18 ft. long.			
220 bd. ft. 2 x 10 spruce, 12 ft. long.			
108 bd. ft. 2 x 8 spruce, 20 ft. long.			
308 bd. ft. 2 x 6 spruce, 14 ft. long.			
288 bd. ft. 2 x 6 spruce, 18 ft. long.			
420 bd. ft. 2 x 6 spruce, 12 ft. long.			

496 bd. ft. 2 x 6 spruce, 16 ft. long,			
1728 bd. ft. 2 x 4 spruce, 14 ft. long,			
6341 bd. ft. framing lumber	20.00	126.82	37.80
8 gable barge boards spruce, 2 x 8 x 20 long, at	.53	4.24	2.33
4 gable brackets, spruce	.35	1.40	.68
120 L. ft. cornice, complete	.20	24.00	11.50
85 bd. ft. 1 x 3 spruce bridging	.02	1.70	.85
1156 bd. ft. 1 x 2 spruce furring	.02	23.12	12.00
84 bd. ft. ¾ x 1 spruce grounds	.02	1.68	.92
2383 bd. ft. ⅞ x 8 spruce shiplap	.022	52.42	23.40
237 bd. ft. ½ x 3½ Y. P. double beaded ceiling	.022	5.21	2.60
15 M. XXX cedar shingles	3.00	45.00	25.00
1822 bd. ft. ⅞ x 2½ birch flooring	.038	69.24	37.95
285 bd. ft. 1⅛ x 3 spruce flooring	.035	9.97	4.75
210 bd. ft. ⅞ x 3 Y. P. flooring	.035	7.35	3.85
5 rolls rosin sized paper	.65	8.25	.50
1. Mill work, 25 cents per hour.			
43 bd. ft. ⅞ x 8 Y. P. base	.06	2.58	1.08
320 bd. ft. ⅞ x 8 oak base	.08	25.60	8.00
36 bd. ft. ⅞ x 8 basswood base	.05	1.80	.90
65 L. ft. ¼ x ⅞ Y. P. carpet strip	.007	.46	.33
452 L. ft. ¼ x ⅞ oak carpet strip	.01	4.52	2.26
54 L. ft. ¼ x ⅞ basswood carpet strip	.005	.27	.25
506 L. ft. oak picture mold	.015	7.59	3.25
2 sets casement window trim, Y. P., ⅞ x 4¾	.75	1.50	.70
1 set casement window trim, basswood, ⅞ x 4¾	.50	.50	.35
12 sets casement window trim, oak, ⅞ x 4¾	.85	10.20	4.55
15 sets door trim, oak, ⅞ x 4¾	.85	12.75	5.25
4 sets sliding door trim, oak, ⅞ x 4¾	1.00	4.00	1.40
11 sets sliding door trim, Y. P., ⅞ x 4¾	.75	8.25	3.80
2 sets door trim, basswood, ⅞ x 4¾	.50	1.00	.70
11 oak veneered doors, 2-6 x 6-6 x 1⅜	3.60	39.60	5.00
4 oak veneered doors, 2-6 x 7-0 x 1⅜	4.20	16.80	4.75
2 Y. P. doors, 2-6 x 6-6 x 1⅜	2.80	5.60	.70
1 special Dutch door, oak, 9-lighted, 3-6 x 6-8 x 1⅜	6.50	6.50	1.25
1 sash door, white pine, 2-8 x 6-8 x 1½	3.50	3.50	.60

MILL WORK.

Mill work, 25 cents per hour.

2 cellar window frames with sash	$1.65	$3.30	$1.00
16 casement window frames	1.40	22.40	8.00
1 outside door frame, 3-6 x 6-8	1.60	1.60	.75
1 outside door frame, 2-8 x 6-8	1.30	1.30	.75
16 casement window sash, glazed	2.30	36.80	10.25
7 sets door jambs, 2-6 x 6-6, oak	1.00	7.00	1.75
2 sets sliding door jambs, oak, 5-0 x 7-0	2.00	4.00	1.00
6 sets door jambs, Y. P., 2-6 x 6-6	.80	4.80	1.50
1 mantel, oak	8.60	8.60	2.00
1 window seat, oak	3.90	3.90	2.50
1 china closet, oak	35.00	35.00	7.50
1 medicine closet, basswood	3.25	3.25	1.25
Pantry cases and shelves, Y. P.	18.75	18.75	5.50
27 bd. ft. closet shelves, Y. P., ⅞ x 12	.06	1.62	.50
35 L. ft. closet hook rail, Y. P., ⅞ x 3½	.02	.70	.50
Material for cellar stairs, Y. P.	..	6.25	7.50
Material for main staircase, oak, newels, balusters, supporting timbers, seat and platforms included	..	26.00	32.50
	....	$993.69	$439.60

TIN WORK.

Tinning, 30 cents per hour.

90 L. ft. valley tin	$0.05	$4.50	$3.25
100 5 x 7 tin flashing	.015	1.50	...
76 L. ft. hanging gutter	.05	3.80	4.00
48 L. ft. conductor pipe	.06	2.88	
	....	$12.68	$7.25

ROUGH HARDWARE.

	Price.	Mat.
3 clean-out doors	$0.75	$2.25
2 thimbles	.10	.20
100 lb. 3-penny nails	3.50	3.50
75 lb. 4-penny nails	3.50	2.63
100 lb. 8-penny nails	2.75	2.75
75 lb. 10-penny nails	2.50	1.88
100 lb. 20-penny nails	2.50	2.50
50 lb. 6-penny finishing nails	2.75	1.38
75 lb. 8-penny finishing nails	2.75	2.06
50 lb. 10-penny finishing nails	2.50	1.25
	....	$20.40

HARDWARE FOR DOORS, WINDOWS, ETC.

14 mortise door locks	$0.70	$9.80
1 mortise door lock	1.50	1.50
2 pair lock sets for sliding doors	1.80	3.60
14 pair 3½ x 3½ loose pin butts	.30	4.20
2 pair 4 x 4 loose pin butts	.35	.70
15 casement window fasteners	.20	3.00
30 pair 2 x 2½ loose pin butts	.15	4.50
2 sets sliding door track and hangers	3.00	6.00
	....	$33.30

PAINTING.

Painting, 25 cents per hour.

	Price.	Mat.	Labor.
Interior.			
176 sq. yd	$0.12	$21.12	$31.68
282 sq. yd	.14	39.48	59.22
Exterior.			
15 M. shingles, dipped	$1.10	$16.50	$24.75
123 sq. yd	.072	8.85	13.28
	....	$85.95	$128.93

PLUMBING.

Plumbing, 30 cents per hour; helper, 30 cents per hour.

45 ft. 3-in. iron soil pipe	$0.20	$9.00	....
48 ft. 4-in. iron soil pipe	.26	12.48	....
22 ft. 2-in. iron soil pipe	.14	3.08	....
275 lb. lead pipe	.13	35.75	....
255 ft. ½-in. galvanized iron pipe	.055	14.03	....
60 ft. ¾-in. galvanized iron pipe	.06	3.60	....
Fittings, solder, oakum, &c.	....	20.00	....
1 galvanized iron water boiler, 35 gal.	7.25	7.25	....
1 iron sink	3.00	3.00	....
1 double wash tub	9.60	9.60	....
1 lavatory	14.20	14.20	....
1 closet	17.50	17.50	....
1 closet	12.40	12.40	....
1 bath	28.60	28.60	....
	....	$190.49	$52.60

ELECTRIC WIRING.

Electric wiring, 35 cents per hour.

150 ft. No. 10 rubber covered wire	$0.027	$4.05	....
675 ft. No. 14 rubber covered wire	.015	10.13	....
125 ft. bell wire	.004	.50	....
250 No. 5½ porcelain knob insulators	.006	1.50	....
200 3-in. porcelain tubes	.003	.60	....
50 4-in. porcelain tubes	.003	.15	....
100 ft. loom	.048	4.80	....
1 snap switch	.30	.30	....
2 three-way flush switches	1.00	2.00	....
10 flush switches	.90	9.00	....
1 main line knife switch	1.00	1.00	....
1 main line cut-out	.60	.60	....
16 10-amp. fuse plugs	.05	.80	....
1 push button	.20	.20	....
1 bell	.60	.60	....
1 battery	.25	.25	....
7 key sockets	.20	1.40	....
7 rosettes	.10	.70	....
21 ft. lamp cord	.045	.95	....
Asbestos, tape, solder, &c.	...	1.50	....
	....	$41.03	$13.85

HEATING.

Heating, 30 cents per hour.

1 No. 50 Hess leader steel furnace	$59.00	$59.00	....
3 10 x 12 floor registers with tin boxes	1.53	4.59	....
1 8 x 10 floor register with tin box	1.07	1.07	....
2 8 x 10 wall registers with stack head and box	1.09	2.18	....
2 9 x 12 wall registers with stack head and box	1.24	2.48	....
1 cold air face	2.35	2.35	....
8 tin connecting pipes in cellar, with collars, damper, elbows, &c.	...	8.24	....
15 yd. asbestos paper	.06	.90	....
1 galvanized smoke pipe with elbows, dampers, &c.	...	2.26	....
1 galvanized air duct	...	12.80	....
3 double tin stacks	...	8.10	....
	....	$103.97	$36.75

RECAPITULATION.

	Material.	Labor.
Excavating	....	$74.80
Mason work and plastering	$399.80	284.66
Carpenter work and mill work	993.69	439.60
Tinning	12.68	7.25
Hardware	53.70	....
Painting	85.95	128.93
Plumbing	190.49	52.60
Electric wiring	41.03	13.85
Light fixtures	52.00	13.00
Heating	103.97	36.75
Totals	$1,933.31	$1,051.44
Grand total		2,984.75

The builder's certificate was signed by Andrew J. Hall, Hopkinton, N. Y.

The Famous Grove of Calaveras Trees.

One of the recent acts of Congress was to enact a measure, subsequently signed by President Roosevelt, which saves for all time the most famous grove of trees in the world and creates the Calaveras National Forest. The land to be acquired under the bill includes about 960 acres in what is known as the North Calaveras Grove, in Calaveras County, Cal., and 3040 acres in the South Grove, in Tuolumne County. The North Grove contains 93 mammoth trees, and in the South Grove are 1380 giant sequoias. Any tree under 18 ft. in circumference or 6 ft. through is not considered in the count of large trees. In addition to the giant sequoias, there are hundreds of sugar pines and yellow pines of astonishing proportions, ranging to the hight of 275 ft. and often attaining a diameter of 8 to 10 ft.

The California big trees are known the world over. The North Grove contains 10 trees each having a diameter of 25 ft. or over, and more than 70 having a diameter of 15 to 25 ft. Most of the trees have been named, some for famous generals of the United States army, others for statesmen and various States of the Union. "The Father of the Forest," now down, is estimated to have had a hight of 450 ft. and a diameter at the ground of more than 40 ft. when it was standing. "Massachusetts" contains 118,000 board feet of lumber; "Governor Stoneman" contains 108,000 board feet, and the "Mother of the Forest," burned in the terrible forest fire which licked its way into a part of the grove last summer, contains 105,000 board feet.

CASTING IN PLASTER A PLAIN MOLDED TRUSS.

BY WILLIAM GREGORY.

IN explaining how to make a plaster truss, it is best to begin with a simple example—that is, one calling for no modeling, scroll work or anything elaborate about it. A design for a plain molded truss for which several running molds will be required is illustrated in Fig. 1 of the accompanying engravings. In doing the work we first get out four pieces of plaster plate ½ in. thick, and to the contour of the truss, as shown in Fig. 2. Fix two of them on the bench, placing them a distance apart equal to the desired face width of the truss keeping them in position by strips of running rods around the outside, all as clearly indicated in Fig. 3. Fill in the space between the two plates with any old waste plaster or clay to within 1 in. of the top edge to serve as a bed on which the face mold will be run.

Having now made a running mold as clearly indicated in Fig. 4, the plaster is poured on to the clay and the mold is run on the edge of the plates shown sectionally in Fig. 4, thus running the whole of the flutes at once. When this has been done the stops both top and bottom may be worked in by hand and the surplus stuff cut away. In doing this care must be taken to finish the truss face some distance above the top of the stops, for reasons which will be apparent as we proceed with the work. Take the two extra plates, perforate them to a 1 in. or other suitable margin, and fix them against the sides of the truss, thus forming a plain sunken panel as clearly indicated at A in Fig. 1. These panels may be molded if so desired.

Next make a mold as shown in Fig. 5, and run a sufficient length of molding on the bench. Cut this up into proper lengths, cutting the ends to a miter, and plant on the sides and face of the truss, thus forming the panel shown at B in Fig. 1. If desired a fielded panel can be made by constructing the running mold as shown in Fig. 6. When the molding has been run and mitered together it will then appear as at C in Fig. 1. It should be remarked that Figs. 5 and 6 represent greatly enlarged views of the running molds for making the panels B and C just referred to.

For the cap make another mold, as shown in Fig. 7, which is also somewhat enlarged. Run a length of this and miter as before; cut up and plant above the panels on the face and sides of the truss, thus forming the cap. For the finish at the bottom make a mold, as shown in Fig. 8, which also represents it enlarged in order to more clearly indicate the details of construction. Run and plant this to the bottom, thus completing the truss shown in Fig. 1.

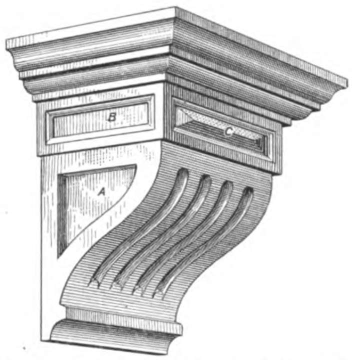


Fig. 1.—Perspective View of Completed Plaster Truss.

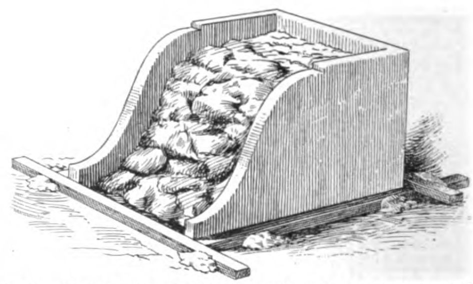


Fig. 3.—Showing Use of Running Rods in Keeping Parts of Mold Together.

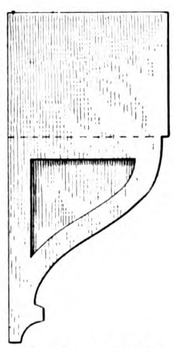


Fig. 2.—Profile of Truss.

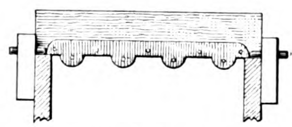
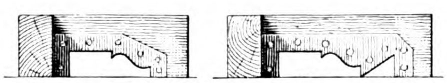


Fig. 4.—Sectional View of Running Mold.



Figs. 5 and 6.—Enlarged Views of Running Molds for Making the Panels "B" and "C" in Fig. 1.

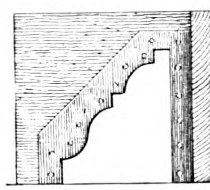


Fig. 7.—Enlarged View of Running Mold for Making Cap of Truss Shown in Fig. 1.

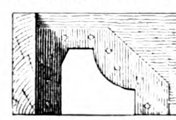


Fig. 8.—Enlarged View of Running Mold for Making Foot of Truss.

Casting in Plaster a Plain Molded Truss.

Now clean up the completed truss, give it two coats of shellac to stop the suction, place it on its side on the bench and having placed a wall of clay around it, as shown in Fig. 9, about 1 in. higher than the highest point, oil the cast and fill in the space with plaster, thus forming one side of the casting mold. It may be here remarked that Fig. 9 shows the work at this stage as it appears when looking down upon it as it rests upon the bench. Repeat the operation on the other side, then clean up the sides and trim them to shape, as shown in Fig. 10, care being taken to make the pieces a little thicker at the bottom than at the top in order to allow them to lift from the case, the front being left exposed, as shown. Take these two side plates of the mold, clean them up and having given them a coat of shellac inside and out place them again in position, taking care that every part exposed has been oiled, after which the whole may be covered with plaster, including the two side plates, thus serving as a mold for the face, as well as a case for the side plates. After it has set take the entire mold apart, give it a clean up where required and apply two coats of shellac.

When the several pieces have been placed together again the mold is ready for the casting operation, and from it any number of casts can be taken.

Public Baths in Schoolhouse Basements.

Among the many interesting papers read before the American Society of Inspectors of Plumbing and Sanitary Engineers at its recent meeting in the city of Omaha, was one on the above subject by Reuben S. Bemis, Inspector of Plumbing at Providence, R. I., and from which we take the following:

The majority of American cities undoubtedly are interested in the question of free public baths. Bathhouses for the use of those who have no bathing facilities in their own homes probably would be provided in about every large center of population but for the expense.

Land, buildings and plumbing are costly, and there are so many pressing demands for pavements, sewers, water mains, fire department equipment, schoolhouses and police service that taxpayers naturally object to any additional burden, and city councils, therefore, hesitate to appropriate money for public baths, notwithstanding general belief in their desirability and practical value.

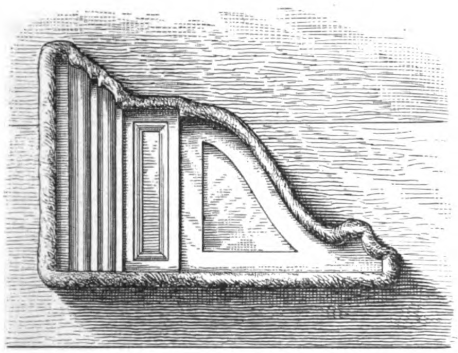


Fig. 9.—View of Work as It Appears When Looking Down Upon It.

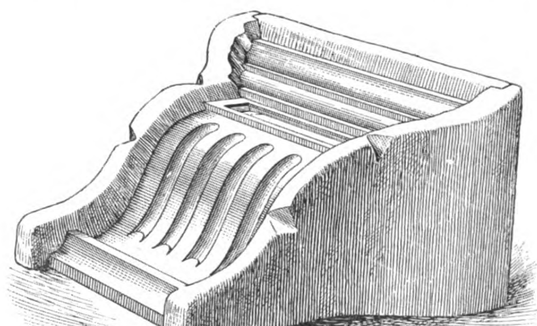


Fig. 10.—Appearance of Truss Just Before Removal from Mold.

Casting in Plaster a Plain Molded Truss.

The public bath question has been discussed for some time in Providence, and, as in many other cities, no progress has been made because of the large appropriation required. It recently occurred to the Inspector of Plumbing in Providence that parts of existing buildings might be utilized for public baths and thus save the city the cost of land and specially designed buildings. The City Council was requested to make inquiry as to the practicability of locating shower baths in the basement of some of the schoolhouses located in districts where free baths are particularly needed.

This plan, the inspector believes, is more than a mere makeshift, but it is not expected to prove a complete solution of the bath problem; it is intended only as a valuable auxiliary, and to meet in part the needs of the public until the city is able to provide bathhouses of ample size and modern construction. This proposition has the merit of simplicity, and calls for an outlay which may be considered nominal in view of the results to be attained. Not a cent need be appropriated for land or buildings; the city now owns the schoolhouses, which are provided with water and sewer connections and steam apparatus, which may be used for heating water for the shower baths.

The schools are closed during July and August, the months in which baths would be most grateful to the laboring population. Only the basement doors need be opened; the upper floors should be closed to the public. There is ample room for partitions separating the showers; drainage is easily obtained and of course water connections cost practically nothing. Bathers can use their own towels and thus eliminate the expense of a laundry, and the attendants can be the regular school janitors, who need no instruction in the operation of its steam plants employed for heating water. Under proper regulations these baths could be opened evenings throughout the entire year, use in the daytime being permitted only in July and August.

Estimates of cost, I am confident, will show that good bathing facilities can be had at moderate expenditure for equipment and minimum expense for maintenance. Therefore it is recommended that the city councils designate a school building in a locality where home bathrooms are lacking, to be supplied with shower baths for the public. One season would demonstrate the practicability of the plan outlined and enable the city to decide whether or not other buildings in the tenement districts should be utilized as bathhouses until a more elaborate system can be adopted.

Shower baths in many schools are reserved for pupils, and their effectiveness in encouraging cleanliness among children has been proved. "Baths before books" is a maxim of Dr. W. H. Maxwell, city superintendent of schools of New York City. This eminent educator, in an address delivered a few weeks since at the American Museum of Natural History before the Playground Association of America, declared that the usefulness to the city in point of morality of the Carnegie public libraries was small compared with that which would accrue from a comprehensive system of public baths.

"As I draw books myself from a Carnegie library and watch the children of the public schools go there for reading matter," said he, "I bless the great iron master for what he has done for the intellectual improvement and recreation of this city, and yet the usefulness from a moral and hygienic point of view of the Carnegie libraries is small compared with the advantages that would flow from the benevolence of him who shall increase the number of public school baths.

"I know of no better way for philanthropists to promote the physical and moral welfare of the rising generation, their health, cleanliness and comfort, than by placing, say $250,000, at the disposal of the Board of Education for the construction of shower baths in all our school buildings in the poorer neighborhoods."

The benefits of shower baths to the rising generation are unquestioned, as Dr. Maxwell says, but why limit them to children? Should not the parents also draw some benefit from the costly school buildings for which they are taxed directly or indirectly? The installation of shower baths in the basements will be as beneficial to adults as the baths now used by the pupils, and if adopted Providence will have the credit of being one of the first, if not the first, to make the most comprehensive use of school buildings for the betterment of its residents.

I am convinced that the bathhouse plan, as briefly outlined, is of general interest, and that every city which looks into it carefully will find that free baths can be furnished thousands of persons without injury to school buildings or any appreciable increase of expenditure.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—IV.

By Edward H. Crussell.

THE jobbing carpenter is often called upon to make alterations to store fixtures, such as counters, shelving, &c. As a general thing it will probably be the lengthening or shortening of them, or moving them from one location to another, but occasionally it may be to construct an entirely new piece. As, therefore, the making of a counter affords us an opportunity to discuss a number of items often met with in the mechanic's daily work, we will take it as a subject for comment in the present article. It is not the intention to discuss the design or the choice of woods, as this is something with which the workman will have but little to do. In making alterations or repairs he must, of course, be guided by the existing fixtures and make the new portions to correspond with them, while in anything but the very plainest of new work the kind of wood will be selected for him and a design furnished as a guide in his work. The idea is to explain the method of doing the work, more especially as regards the gluing up of the counter top.

In all work in which there is gluing to be done the glue pot should be the workman's first consideration. It takes some little time to properly prepare glue and much time is often wasted by first preparing the material for gluing and then attending to the glue pot. Often it is found empty and the workman must kill time while the glue is soaked and melted. Of course there are shops where the glue is kept always ready for use, but these are not the shops we have in mind at the moment. There are also various kinds of liquid glues to be had and doubtless they have their uses, but in any work of which you wish to feel proud it is much better to place your trust in the old reliable. Although a little more trouble to prepare, it has the advantage of setting quickly and will set about as well in wet weather as in dry.

Much has been written upon the subject of glue, but there is still room for further information, and as it is absolutely impossible to make a perfect glue joint with poor glue, a few words on this theme may not be thought amiss. Glue in its dry state should be hard, tough and semitransparent. To prepare it for use break it into small pieces, place it in the inner vessel of the glue pot, cover it with clean, cold water and leave it to soak for a number of hours. The usual method is to let it soak over night. After it has been soaked, fill the outer vessel of the glue pot also with clean water and apply heat. The water in the outer pot should boil and so continue until the glue is melted. The hotter the glue the stronger the joint, and in all large and long joints it should be applied immediately after boiling. By frequent remelting glue loses much of its strength and in all work of importance it is best to be on the safe side and make fresh glue. Be sure and have clean water in the outer pot, because it is nearly always necessary to add some of this water to the glue in order to bring it to the proper consistency and if it is dirty or greasy it will surely spoil the glue. It is possible to prepare glue for use without the preliminary soaking, but it must always be covered with water, and unless the glue is wanted immediately the method of soaking is best.

As already mentioned, it is nearly always necessary to reduce the glue after it is melted, and it requires some little practice to get this just right. The novice in an endeavor to make the glue strong generally makes the mistake of having it too thick, which is very probably the cause of most of the trouble in the matter of making glued joints. Experienced workmen test the glue by dipping in the brush and allowing the glue to run from the end of it. The glue should run freely, but not break into drops; if it does it is too thin, while if the least portion hanging to the bristles curls up the glue is too thick.

This method is not always reliable because different grades of glue vary too much. The surest method is to make a test as follows: Take a small piece of board a few inches square and run a brush full of the glue on it. Hold it in the hand a little longer than you think it will take you to glue and cramp up the joint, and then try it with the forefinger; if it is still soft and does not feel sticky it is not too thick for your purpose. Wait a little longer and then try again. It should now begin to drag and feel sticky. If it does not do so in a reasonable length of time it is too thin or the glue is poor.

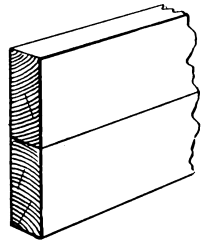


Fig. 17.—A Square Joint.

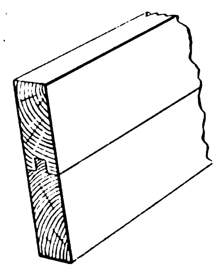


Fig. 18.—A Matched Joint.

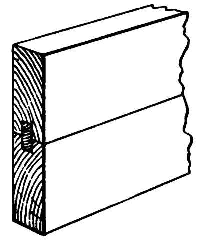


Fig. 19.—A Tongued and Grooved Joint

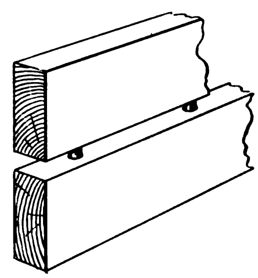


Fig. 20.—A Doweled Joint.

The Jobbing Carpenter and Some of His Work.—IV.

A good glue joint is stronger than any other part of the board, and will still hold together though the board be broken into pieces. This kind of joint is easy enough to make in pine or any of the soft woods, but to do as well in quarter sawn oak or maple requires the best of material and favorable conditions.

If the work is being done in the winter time it is essential that the shop be warm and free from drafts, especially if the job is of any size. It is impossible to make good joints if the glue chills before they can be brought together. Shops and factories that have much gluing to do usually have a special compartment for this purpose, but the jobbing shop seldom has room for this sort of thing and is often cold and drafty. The mechanic who has conditions of this kind to contend with can overcome them somewhat by standing his material around the stove so as to have it thoroughly warm, and by doing the gluing in two or three operations instead of in one. It may perhaps also be well to bar the door so as to prevent any one opening it and allowing a cold blast to fall upon the work in the midst of the performance.

What we mean by two or three operations is as follows: Suppose our counter top is composed of four pieces necessitating three joints. Under favorable conditions it would be easy to glue and cramp all of the joints at one time, but in a cold shop the glue would chill

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—Editor *Carpentry and Building*.

long before this could be accomplished, so we first glue the pieces together in pairs and when dry glue together these two pairs.

There are perhaps some readers of this journal who are accustomed to ideal conditions of material and work shop and who will smile at the above methods, and would perhaps refuse to conform to them. The jobbing carpenter, however, must wherever possible "deliver the goods," his creed being that difficulties encountered in his work are the only means he has of showing how much smarter he is than the other fellow.

Having made certain that our glue will be ready for use when we need it we will now prepare the lumber. Joints of various kinds are shown in Figs. 17 to 20, inclusive. In Fig. 17 is represented a square joint; in Fig. 18 a matched joint; in Fig. 19 a tongued and grooved joint, and in Fig. 20 a doweled joint. Authorities differ as to which is the best form, but the writer's preference is for the square joint in all material up to ⅞ in. thick, but for the doweled joint in thicker material.

A former writer on this subject has claimed that the matched or tongued joint is the stronger because there is more surface for the glue. This somehow brings to mind the story concerning the old woman's table top, which was a classic in the shop where the writer was an apprentice. In explaining why the table top fell to pieces the old woman said, "'Twas no wonder, for the glue in it wasn't no thicker than a penny piece."

Mediaeval Builders.

That the mediæval builders were excellent workmen sometimes turns out to be only half a truth. They were very great artists, and where the object was to create a thing of beauty they were quick in answering to the call. But when the matter was one of science rather than of art—when, for example, they had to consider not how a church would please the eye or excite the devotion of a worshiper, but how it would stand—their skill seems at times to have deserted them. It was the skill, that is to say, of the instinct, rather than of the reason. They knew how to raise their columns and vault their aisles. So far they could be trusted to make no mistake, says a writer in an exchange. But in the matter of foundations there was no such certainty. They made them as secure as they could, subjected them probably to such rude tests as regards strain and pressure as occurred to them, and if the walls seemed safe and the site was what they were seeking for in other ways, they were content. And in fairness it must be admitted that for long periods their confidence was justified. Centuries have in many cases passed without any shortcoming disclosing itself. Recently, however, defects of all kinds have come to light with alarming frequency.

A cathedral is no longer a type of solidity. Its walls may be out of the perpendicular. Its towers may incline at an angle which suggests a speedy fall. Its mighty stones may be parted from one another by cracks which threaten to become chasms. Then the architect begins his search for the cause of these faults, and before long he discovers they have their common origin in the soil, or substitute for soil, on which the building rests. If that has sunk or changed its character, the greatest cathedral in the world may be no more secure than a wooden shanty. Indeed, the danger of a catastrophe increases in proportion to the size which to the eye makes it immovable. The greater the superincumbent weight the more unfit may be the soil on which the foundation rests to bear the burden laid on it.

Sometimes the builders were plainly wrong in their choice of a site. The ground which they thought would serve their purposes was never really suited to it, and the wonder is, not that this fact has at last been discovered, but that it has remained so long undetected. Sometimes the ground they picked out would have done its work for many more centuries if it had been let alone. But to let things alone is just what civilization is unable to do. New theories about health come into vogue. The land in the neighborhood of the cathedral is wanted for building, and to make building wholesome it must be thoroughly drained. But drainage may alter the level of the water underneath the surface, and where this is the case the level of the subsoil may alter also. When that sinks, the foundations it supports naturally try to follow it, with the results with which we are becoming sorrowfully familiar.

AT A MEETING of the trustees of the Order of Free and Accepted Masons, recently held at Utica, N. Y., it was decided to demolish the present Masonic Temple at the corner of Sixth avenue and Twenty-third street, Borough of Manhattan, N. Y., and erect upon the site an 18-story steel frame office structure, plans for which are underway by Architect H. P. Knowles. The building will be of fireproof construction, requiring about 3500 tons of structural iron, and the general style of the façades will be in keeping with the 18-story annex building just completed by the Order directly through on Twenty-fourth street from the present Temple.

SYSTEM IN THE EXECUTION OF BUILDING CONTRACTS.*—III.

BY ARTHUR W. JOSLIN.

THIS daily routine of visiting the various jobs; receiving the information for the work from the details; transmitting the information to all parties concerned; purchasing the materials; seeing that the subcontractors get around as agreed and perform their work properly; keeping the foreman informed as to what you want done; when you want it done and well supplied with help, as well as with details and stock; all stuck to persistently from the minute a contract is signed until the job is completed is sure to have results.

Guard against one thing, and that is, allowing your energy and persistence to cease when you get along toward the end of a job. By this time you are about starting, or are in the midst of other jobs and are losing interest in the one nearing completion; at least, I am assuming that you are because I always do myself. It is then that I bring all of my will power into action, determined at all hazards to visit this particular job as often, or even oftener, than before and see every single thing done, and that expeditiously, in order that I can have the time that all this is taking to devote to the other, and for the time, more interesting jobs. This almost invariably results in the jobs being done on time, and if I have succeeded in getting ahead of my schedule a little every now and then, in getting an acceptance ahead of contract time.

In writing the above, I have assumed that the job was so located that it was possible to see it every day, or at least three or four times a week. If the building happens to be 100 or 200 miles from the office, the method of handling must be modified somewhat and how we manage such work will now be explained.

It is, of course, out of the question for you to see such a job daily or even several times a week. I generally plan to visit once a week, work that I can readily reach and get back from in a day, getting up early in the morning so as to get a train around 6 to 6.30 a.m., thus getting to the work as early as possible. I choose for the regular weekly trip the pay day, having time taken up to 5 p.m. of the second day preceding the one on which I make my visit, so as to enable me to have all the envelopes made up in the office the day before pay day. These I take home with me the night before going to the job, so as to go direct from home to the station.

Having reached the job, I go throught the same routine I have described for the daily visit to the nearby

* Copyrighted, 1908, by Arthur W. Joslin.

job, except that it takes longer as there is more to see, more to explain to the foreman and more planning ahead for future work I want done and materials that the work will require. Having established the day for this weekly visit, I make it known to everybody with whom I am doing business, subcontractors, material dealers, &c., notifying them that if they want to see me at the building about anything to come there that day, and that if there is anything about which I want to see them there I will notify them, giving them as much notice as possible. I also try to have the architect or his representative make his visits to the work on these days. Now I let nothing, except of the utmost importance, interfere with my weekly trip. By making a long day at the job, spending a great deal of time with the foreman and subcontractors, explaining work and ordering materials as far ahead as possible, I find that the job will run nicely until my next visit.

Isolated work like this requires a very competent foreman; one of the kind of men who is resourceful, of good executive ability, temperate and trustworthy. In fact you want a man as good as yourself and you cannot expect to find him for $18 to $20 per week. The right man is cheap at any price under $40 per week, plus board and railroad fares, if the job is of any size. If 25 or 30 men are employed, he can handle the work enough better than an ordinary foreman to save you his week's wages every day that the job lasts. If anything comes up between visiting days that cannot be settled over the telephone, which I instruct the foreman to use freely if necessary (preferably in the evening, as it does not then interfere with his or my day's work), then another trip must be made as soon as possible.

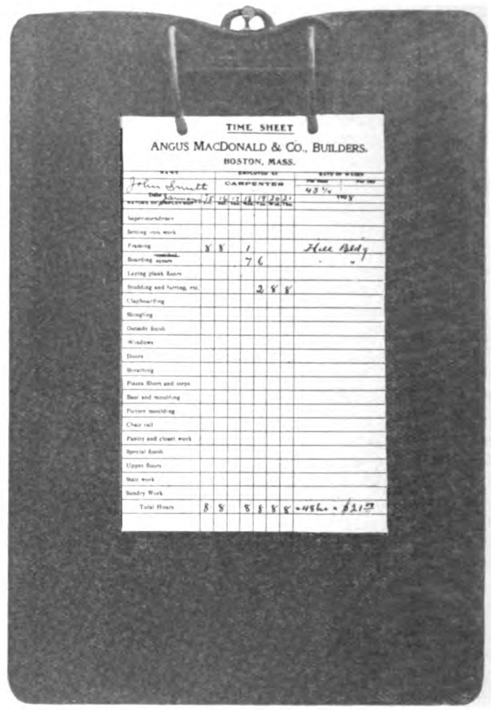
If the job is of fair size, say, $25,000 or more, enough help will be employed to make a timekeeper desirable, if not an absolute necessity. I find that it is usually possible to employ some young man locally who is well vouched for and with at least a high school education, who will work for from $10 to $15 per week, making as long a day as circumstances require. If one cannot be found locally, there is always one to be found in the city who will go anywhere you want him. In addition to keeping the time he can look up freight that is arriving, arrange for teaming, chase up local subcontractors and material men, tally and check quantities of materials, check the bills of them sent to the job from the office for this purpose before they are entered in our books to the dealer's credit, assist the foreman in laying out work, take charge of a small crew of men on some kinds of work under direction of the foreman, and so on indefinitely. In fact, it is surprising the amount of petty detail work that such a man can do if properly handled and it all serves to relieve the foreman and give him the greater part of his time right on the job with the help.

The three most important duties that I give to the timekeeper are keeping the daily journal or "log book," keeping the divided time and checking quantities of materials. For these purposes I provide him with two books and fully instruct him. I give him these instructions in the presence of the foreman, and require him to perform the duties involved under the foreman's superintendence and inspection.

In the journal I have him take a page for each day, putting the date on the top line; follow this with the weather, the number of men of each trade employed—first our own men and then those of all subcontractors, including any employed by the owner; a complete résumé of all materials received at the job and from whom; a synopsis of the work that is being performed by our own help and all subcontractors; make note of who visits the job, as, for instance, the architect, owner, subcontractor, material man, inspector, superintendent, member of firm or any one, in fact, not a regular and daily visitor; also a particular record of any accident or unusual happening; in fact, any and every thing that suggests itself as of possible value to me to know about that takes place. This will consume about one hour's time, not all put in at one time, and just about fill one page of the book 14 or 15 in. long, on the average.

The value of this record may be almost worthless on one job and on the next one contain information that would win you a lawsuit; as, for instance, the information it might contain in regard to delays by subcontractors working for the owner or delay in delivery of material that he was to furnish; record of visits of an inspector and of some order given by him; particulars of and names of witnesses to an accident of some kind that you might be sued for six months after the work was completed, &c. Taking so little time and liable to be of so much value under circumstances that might arise, by all means insist upon this journal being kept if a timekeeper is employed.

The checking of bills is very important if you do not want to pay for materials not received. Brick, for example, which are purchased by the thousand delivered, coming in two-horse carts containing from 1000 to 1800 brick, are usually accompanied by duplicate slips, one to be left by the teamster with some one in authority at the



Weekly Time Slips as They Appear When Placed on Wooden File Ready for Use.

System in the Execution of Building Contracts.—III.

job and the other to be signed by said person and returned to the party selling the brick by the teamster. With common brick costing $7 or $8 per thousand it is almost as cheap to permit yourself to be cheated out of a hundred or two of brick to a load as to undertake to count each load, on account of the time and expense involved in doing so. To take the foreman from his work is out of the question. Here the timekeeper can be made use of by giving him a laborer or two and having a load counted now and again, especially, if upon looking at the load before it is dumped, it appears to be small for the number of brick called for by the slips. When a dealer knows that you are apt to count a load at any time and do actually do so every day or two, he will see that every cart going to your job contains full count. I do not mean to imply that all dealers take advantage of contractors in this way, but I do know that some of them do, and when in some distant place, dealing with strangers, it is worth while having the word go abroad that you are going to get what you pay for in quantity and quality.

Brick coming by cars are usually piled regularly, even if only common brick, and always if face brick. In this case, timekeeper should measure and cube the contents of the car before a brick is taken from same. It can readily be determined by the cubic contents if the car contains the number of brick called for by the bill of lading.

In a similar manner lumber can be approximately surveyed on the teams or cars before unloading; sand, gravel and crushed stone checked up with accompanying slips; schedules of steel, lumber, window frames, doors, &c., checked; and all materials be checked and accounted for and practically none of the foreman's time be drawn upon to do so. All shortages, real and apparent, should be called to the attention of the "office" and the shipper immediately, so that the matter can be straightened out at once. Letters or the telephone will accomplish this. All slips received with loads should be retained by the timekeeper, and all bills for materials should be sent to the job as soon as they are received at the office, for him to check and "O. K." if they are correct. The journal and duplicate slips furnish an accurate record of materials received, and in a very little time the timekeeper will go through them all. We do not place the amount of invoices to the credit of the party selling until the bills have been checked and "O. K.'d" as above.

The next and most important duty of the timekeeper is to keep the time, not only getting the total hours that each man works per week, but the number of hours each man has on each division or class of work. For this purpose I have devised time slips, copies of which may be seen in *Carpentry and Building*, June, 1906, page 193. On the first morning of the "work week," which in our case is Friday, the timekeeper makes a slip for each man employed, fills in the dates and rate of wages and puts them all on a Shannon file with those of each class of help together. Our slips are punched on the top edge to fit this file, although the illustration above referred to does not show punching.

Immediately at starting time he makes a round of the job to see who are present and at what they are going to work. He then makes several rounds of the job during the day, one being right after the noon hour and one starting in time enough before the end of the day to see what all of the men are doing and who are there at the end of the day.

Upon coming to each man on this final round he questions him as to the various divisions or classifications of the work he has been engaged upon and how many hours upon each class, entering upon the slip the hours thus obtained under their proper heading. The help are cautioned to notice the time of day if shifted from one class of work to another and the timekeeper's several trips and part that he may take in assisting the foreman at superintendence, also familiarize him with the shifts that are made during the day, and between the individual workman and the timekeeper a very accurate résumé of the day's work can be obtained and immediately entered.

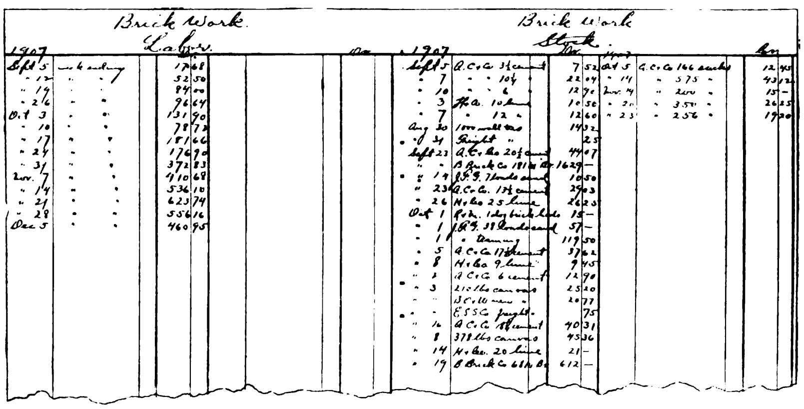
Should a new man come on at any time during the week, a slip is immediately made out for him and inserted in the file with other help of his class. At the end of the week this file contains each man's total time, from which a report for the payroll can be made out, and a couple of hours' time will pick out the total number of hours and the cost in dollars and cents for each class of work for the week. Now remove the slips from the file, securing pieces of string through the holes, lay to one side and make new slips for the next week and put them on the file.

Now in the book provided for the purpose have the timekeeper record these hours and costs, each under its proper heading. The best book for this purpose is one about 10 x 14 in., with ledger ruling, two columns to a page. On the first page of the book write the heading of the class of work first encountered and under same write the word "labor." On the opposite page write the same heading and the word "stock." The two ledger pages will then have the appearance indicated in the reduced fac-simile presented herewith.

Where the nature of the item is such that there will be stock or other credits, instead of using both columns for charges against the item, the right hand column may be used for "credits," as shown on the reduced pages.

Now on this left hand, or "labor" side, both columns, enter "labor"; on the right hand, or "stock" side, both columns, enter all stock, quantity and cost, immediately after checking up the bills and before sending them back to the office. Also on this "stock" side enter all cash expenditures that go to make up a part of the cost of this class of work.

The "labor" if you choose can be subdivided several times for each class of work. As, for example, on a large factory job you might want to divide the cost of the labor under the head of "windows" into handling and setting frames, jointing in sash, stop beads and finish



Reduced Fac-simile of Two Ledger Pages of Cost Book.

System in the Execution of Building Contracts.—III.

and applying hardware, to enable you at completion of work on windows to more thoroughly analyze and tabulate your costs. This may readily be done by making four entries of hours for the week instead of one, adding after each entry the name of subdivision. Before starting another heading leave room enough to make all probable entries under the classification started. Generally speaking, the two double columned pages will take care of almost any division of the work for a pretty large job.

At the completion of the job, or before, if the work under the heading is completed, the unit costs can be worked out accurately by simply adding up each column, totaling them and dividing by the known unit. Take the item of brick work; run down through the stock side and get the total number of brick, divide total cost of labor and stock and you have the cost of brick per 1000 laid in the building.

If you want to analyze further it is possible to go down through the "stock" columns and pick out the quantity and cost of lime, cement, sand, stage stock, &c. In the labor column, if you have made provision to do so, you can pick out the labor of making and carrying mortar, handling and carrying brick, building and taking down stage (unless you make this latter a separate item, which I usually do on jobs of any size), laying brick and washing and pointing. Thus you can work out the cost of 1000 brick laid in the wall in detail and with accuracy.

(To be continued.)

CONCRETING IN FREEZING WEATHER.

ONE of the very important questions arising in connection with concrete work is whether or not it is safe to lay concrete in freezing weather. Much discussion has ensued on this point, and various opinions advanced as to the results secured when executing work of this character in low temperatures. A recent contribution along this line is comprised in an article by J. H. Chubb, assistant inspecting engineer of the Universal Portland Cement Company, which appeared in the *Bulletin* issued by that concern. It is of such manifest interest to a wide circle of readers that we reproduce it herewith:

The satisfactory results frequently obtained during the winter months with Portland cement concrete serve as an incentive for increased activity and encouragement for carrying on concrete work under unfavorable weather conditions, and we wish to caution against the growing disregard of and apparent indifference to the importance of properly placing and protecting such work in freezing weather. We do not wish to advocate that all concrete work should be brought to a close at the approach of cold weather, for such is not the case, as work can be successfully accomplished in freezing weather, but we do wish to condemn the all too prevalent practice of mixing, placing and caring for concrete work in freezing weather in the same manner as in warm weather. To properly lay concrete in freezing weather means additional care and expense; therefore, as a general practice, concrete work should be avoided in freezing weather unless circumstances warrant this additional expense.

Freezing Not Injurious.

While there is a difference of opinion among engineers as to the effect of freezing upon Portland cement concrete, the general opinion is that freezing will not damage concrete that has hardened. The freezing simply retards the process of hardening which again proceeds under favorable conditions, and the concrete eventually obtains its full strength. On the other hand concrete that is frozen before the action of hardening has started is not apt to be injured, if, upon thawing, it is not again frozen until it has had a chance to harden sufficiently to withstand the action of subsequent freezing, but alternate freezing and thawing, which allows the intermittent action of hardening, is very apt to damage concrete.

Interesting and valuable experiments were conducted at the Watertown Arsenal in 1901, the results of which demonstrate very clearly the effect of low temperature upon the strength of cements and cement mortars, and, we believe, substantiate some of our statements concerning this question. A part of these experiments consisted of placing groups of cubes in a cold storage warehouse, where some of them were subjected to a temperature of 39 degrees F. and some to a temperature of 0 degrees F. Those subjected to the lowest temperature were mixed and molded in a temperature below freezing. All cubes were subjected to the tabulated temperature as soon after mixing as practicable, and before being tested were kept at a temperature of 70 degrees F. for the number of days indicated. Below are tabulated some of the results on cubes composed of a 1:1 Portland cement mortar, gauged with 16 per cent. water for the group subjected to 0 degrees F., and 12 per cent. water for the other group. For complete description and results of these experiments see "Tests of Metals," U. S. A. 1901, page 530, from which these results were taken. Each strength shown is the average compressive strength in pounds per square inch of five 2-in. cubes:

Days at 0° F.	Days at 70° F.	Strength.	Days at 0° F.	Days at 70° F.	Strength.	Days at 39° F.	Days at 70° F.	Str'th.
5	1	287	5	7	846	15	0	1,710
14	1	321	14	7	1,000	31	0	1,960
21	1	337	21	7	1,010	60	0	2,460
31	1	383	31	7	981	15	7	2,710
60	1	416	60	7	981	31	7	2,720
90	1	497	90	7	1,010	60	7	3,270

The proper precautions necessary to insure satisfactory results for work laid in freezing weather depend upon the class of work, large plain mass work not requiring the same care and protection as small reinforced construction. Work can be successfully carried on during freezing weather by either one or both of two methods; heating the concrete materials and then protecting the work until it has had a chance to harden, or for temperatures but little below the freezing point by the use of salts to lower the freezing point of the concrete. Elaborate plants for heating the materials and protecting the work have been constructed, and successfully used during the coldest weather.

Lowering the freezing point of the concrete is the simplest and cheapest, but probably not the best, method of concreting in freezing weather. This method consists of adding some substance to the mixing water that will reduce its freezing point, but only those substances that have no effect on the strength and durability of the concrete can be used. Ordinary salt is most commonly used for this purpose, and experiments indicate that while the addition of a limited amount of salt retards the hardening somewhat, and lowers the initial strength, the ultimate strength of the concrete is not affected by its use. Salt should be used only in plain concrete work, as its effect on reinforcing metal has not been established. Even when salt is used it is important that the aggregates be free from lumps of frozen material, as it is impossible to properly mix such materials. Approximately 1 per cent. by weight of salt to the weight of the water is required for each degree Fahrenheit below freezing, but more than 10 per cent. of salt should not be considered safe, and this amount is not effective for temperatures lower than 22 degrees F.

The best method of concreting in freezing weather is to heat the materials and to protect the work until it has obtained sufficient strength to withstand the action of frost. Either the water, sand and water, or sand, stone and water should be heated. The cement is usually not heated. Heating the materials accelerates the rate of hardening, lengthens the time before the material becomes cold enough to freeze, and in temperatures but little below freezing will insure the hardening of the concrete before it can be damaged by freezing.

Not Necessary to Heat Stone.

For heavy mass work, thick walls, abutments, &c., it is not necessary to heat the stone except in exceptionally cold weather, but sand and water should be heated. If the forms are tight and made of heavy material it will only be necessary to protect the top of the work; this may be done by covering with a canvas and running steam under it, or by covering with boards or paper and applying a covering of straw or manure. If such work is protected from freezing for several days it is sufficient, unless it has to be loaded immediately, but thin walls, light foundations, &c., should be protected on all sides in the manner pointed out above. For reinforced work it is necessary to heat all the materials but the cement, and the concrete should be hot when placed in the forms, and where the work must be placed into service as soon as possible, the only safe practice is to keep the surrounding temperature well above the freezing point until the work has thoroughly hardened.

Concrete increases in strength but very slowly in cold weather, and for this reason forms should be left on as long as possible, and care taken not to load a structure too soon. Just how old the work should be before removing the forms and subjecting it to its load cannot be stated, as this will depend entirely upon how fast the concrete hardens. Careful inspection of the structure is necessary before removing the forms and applying the load, and it must be remembered that frozen concrete, which upon thawing has but little strength, closely resembles thoroughly hardened concrete in appearance, and when broken frequently shows a fracture through the aggregate.

All classes of concrete work, with the exception of walks and pavements, may be constructed in freezing weather, but to insure satisfactory results proper precautions are necessary, which will entail an additional expense, depending upon the class of construction and importance of the work.

BRACKET AND SCROLL SAWING.

By C. Tobyansen.

THE dictionary defines the word "bracket" as denoting a "wooden support," which is sufficiently correct, broadly speaking, for all practical purposes, while a "scroll" is defined as an ornamental feature only. This distinction, however, is but a casual one, as a supporting bracket or what poses as such is often a "scroll." It is, therefore, difficult at times to decide how properly to name these articles, so if we should happen to term that thing a scroll which the reader might think should be classed as a bracket, or *vice versa*, we trust the above explanation will suffice as an excuse. There are also forms which singly would be termed brackets, but which combined, border closely on the molding, which forms we will refer to later on.

In order to cover these objects so generally distributed about a building, both inside and out, we shall commence at the apex of the roof and work our way down systematically, giving just a few general remarks in passing regarding styles and fancies.

Every student of architecture, as well as the observant building mechanic, must have noted the reaction of late years from the fancy styles so prevalent in cottage building a few years back; "gingerbread work" we feel inclined to call it now, as we look upon the more extravagant examples loaded and overloaded with crestings, scrolls, tracings, brackets and fancy turnings in all manner of combinations. It seems as if one vied with another in originating new fancies and discovering or creating nooks and corners wherein to place them, not questioning very closely as to suitability or tastefulness.

All of a sudden the reaction came along with the "mission" style of furniture. Out of the riot of curves came the other extreme. Squareness, flatness and straight, cold lines became the vogue—of trimmings there were none or scarcely any. As a form of restitute the rough lines became more complex. Brackets were used sparingly; scrolls and turnings not at all, except as to columns, and these were even as often as not merely square boxes. It was the advent of the "Colonial order," so called, but why the writer does not know, as it apparently embraces all known orders and some disorders as well.

But, as is the nature of things when this other extreme—that of the straight line and sharp angles—had been reached, the reaction commenced and is now well under way. The lines of beauty are superseding again both in the building and furniture trade, for somehow one is a reflex of the other. Corners are being rounded, stealthily almost, but surely; rafter ends and verge boards are losing their stiffness and clumsiness; the turned baluster grazes broad porches and piazzas once more, and the picket fence style is passing. Auto sheds—garages I suppose they should be styled—and other outbuildings are adorned with crestings and finials; yea, and some substantial dwelling houses as well, while the bracket—our subject in hand—is again claiming the cornice as affinity. Thus having touched on both extremes, that of extravagance and poverty of ornamentation, methinks we may strike the golden mean and stay by it.

The ornament placed along the ridge of a roof is termed cresting, various designs of which are shown in Figs. 1 to 7, inclusive, of the illustrations. It is commonly sawed out of 1 or 1¼ in. stock. This is heavy enough if the design is but slightly indented, such as Figs. 1 and 2, but when it is a pattern of deep incisions, as Figs. 3 and 4, or scroll forms, as Figs. 5 and 6, which are easily chipped and broken, they should be cut out of not less than 2-in. stock. Cresting partly broken is a decided disfiguration on a building, and as a rule, when once placed in position, it is but seldom given needed repairs. Care should also be taken in the selection of stock and hard, brittle lumber be avoided, especially cypress, as it checks badly when exposed to the elements. These remarks apply with equal force to scrolls or light brackets.

The pattern shown in Fig. 3 makes a very satisfactory cresting, being neat and clean cut, as well as cheaply and handily made. The method of making is indicated in Fig. 8 of the illustrations. A piece of stock as at A is procured 1¾ in. thick by 8 in. high and of whatever length may be required. If it is a very long piece of cresting it had best be made in shorter sections. Draw

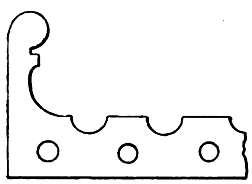


Fig. 1.

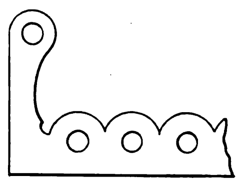


Fig. 2.

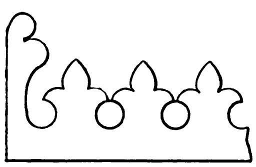


Fig. 4.

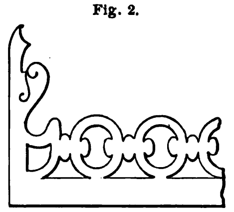


Fig. 5.

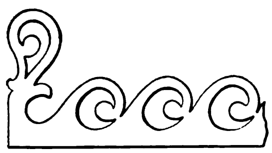


Fig. 6.

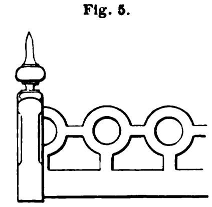


Fig. 7.

Figs. 1 to 7 Inclusive.—Plain and Fancy Crestings.

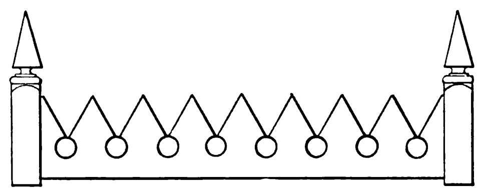


Fig. 3.—A Cresting Easily Made.

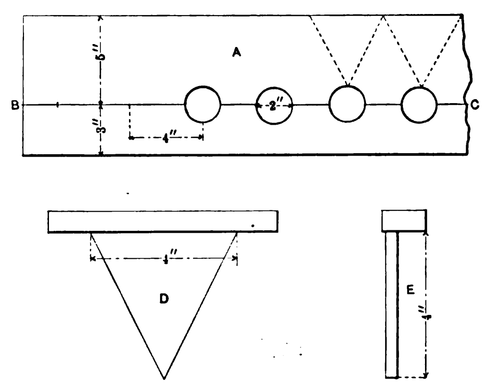


Fig. 8.—Lay Out of Cresting and Marking Pattern for It.

Bracket and Scroll Sawing.

the line B C 5 in. from the top and proceed to space off the centers for the holes 4 in. apart, boring these with an extension bit set at 2 in. The perforations being completed make a wedge shaped pattern, as at D and E, which represent side and end views, respectively. The edge shaped piece may be about ½ or ⅞ in. in thickness —whatever we happen to have handy—and is 4 in. wide at the base and 5⅛ in. to the point, which corresponds to the dotted lines on the board A. The top cleat is nailed to the wedge piece merely as a convenience in sliding along the edge of the board when marking, the cleat being on the edge and the wedge on the face. Place the point of the wedge centrally to each hole and draw marks along the sides of the former. Straight cuts along these marks will finish the cresting.

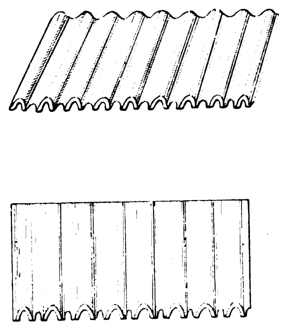


Fig. 9.—Two Views of Corrugated Iron Fastener.

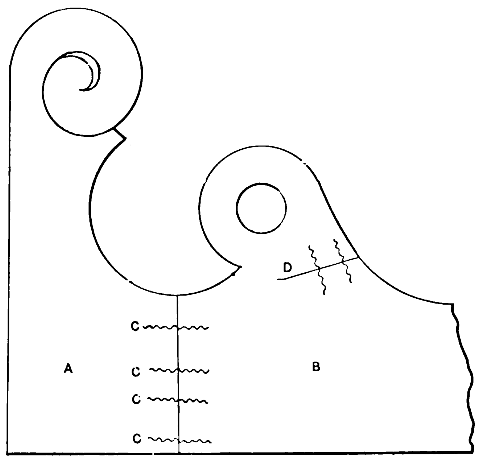
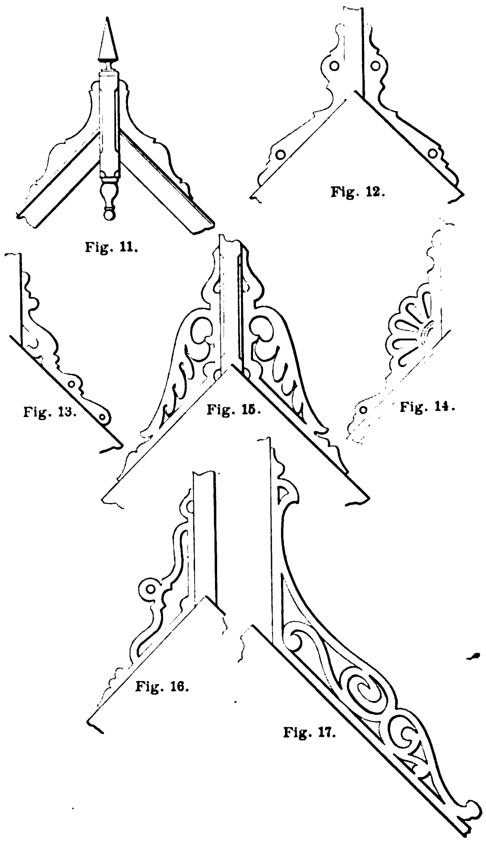


Fig. 10.—Showing Application of Corrugated Fasteners.

If a check is found in the stock a couple of fasteners applied across it as suggested at D in Fig. 10 will stay further damage or a piece entirely broken off may be readily applied again. The fastener is something a mill man would not be without when once initiated into its uses, which are not restricted to crestings and the like, but enter into all forms of woodwork.

Another roof ornamentation is the finial, generally consisting of a central square post with turned ends extending above and below the gable and a pair of brackets. Such a finial is shown in Fig. 11. The central piece, which is the finial proper, whether supplemented with brackets or not, may extend above the gable only, and rest directly on the ridge boards as shown in Fig. 12. It is the aim of the writer in these illustrations, as in those which will follow, to give a distinct variety, each pattern to embody some special style of design forming



Figs. 11-17.—Finial Brackets and Scrolls.

Bracket and Scroll Sawing.

If the scroll does not finish up against a finial, as is usually the case in this section, but has a sawed end finish, it is advisable both for economic reasons and for strength to saw it separately, having the grain running lengthwise; that is, from the bottom up. It may then be fastened on the main piece with nails, dowels or corrugated iron fastenings. Lest the reader should not know what is meant by this last named article we would explain that it consists of a piece of thin corrugated sheet metal about 1 in. in length and from ¼ to ¾ in. in width. The part which first enters the wood is ground to an edge from two sides. An idea of the fastener may be gained from an inspection of Fig. 9, while the manner of its use is indicated in Fig. 10, where A and B are the parts to be connected and the fasteners are shown in position at C, C, C. They should be applied to both sides of the joint. A very handy and practical article is this fastener. It can be readily used where a nail or screw would only serve to weaken; it does not split the wood, has great holding power and makes a strong joint.

a base wherefrom other more or less elaborate styles may be derived or originated.

The designs shown in Figs. 11, 12 and 13 are all solid brackets, having no sawed perforations. They can, therefore, be completed on the band saw, excepting, of course, the round holes, which are simply borings; or they may be turned rosettes planted on. The balance of the designs, Figs. 14 to 17, inclusive, are all perforated with sawings and partake more of the scroll. These require the aid of a jig saw for execution and are far more costly than the former, as the machine must be stopped and the saw removed and inserted in a hole bored in the stuff for this purpose, all of which absorbs time, while on the band saw it is one continuous cut. It is the desire of the writer, however, to catalogue in a sense the different designs, combinations and uses of brackets and scrolls before entering upon the subject of workshop and modes of procedure to any great extent. We have, therefore, given each illustration a figure number so as to readily refer to them later on.

CONSTRUCTION AND COST OF SMALL CONCRETE HOUSES.

AMONG the very interesting papers read at the recent convention of the National Association of Cement Users, held in Cleveland, Ohio, was one on the above subject by C. R. Knapp of Philadelphia, which is of such suggestive value to a large circle of our readers that we present it herewith:

The use of concrete for small and medium priced dwellings, stables and garages presents a vast field for operation. In my opinion it is one of the largest in the cement world.

The construction of large concrete buildings in nearly every city has been an object lesson to the people. It has given them much food for thought and, as thought begets investigation, they are fast putting two and two together and arriving at the conclusion that what is good for the hard headed man of large finances, who has had scientific and expert advice, must be good for them. Fortunately they are not confronted with a proposition involving the intricate engineering problems of large structures. There is, however, one point to be made clear, and that is the cost. This to the masses means much. In talking with people about concrete, invariably the first question always is: "How does concrete construction compare as to cost with other building materials?" In answering this question let us take up an analysis of the cost of the different materials and see just where concrete construction really stands.

Stone, or stone backed with brick, is admittedly much higher in cost than other materials. If the stone is quarried on the lot near building site, the cost will be somewhat lessened, but will be still higher than brick.

Cost of Frame Construction.

Frame construction has not the same standards of cost as other materials. We cannot, therefore, give reliable data. For example, one contractor offers to build a house for $2000; another, the same house for $2500, and a third contractor will ask $3000. What do you get? Simply what you pay for, no more no less. The first house is merely thrown together, good only for from 3 to 5 years, and is then apparently an old house, its value having depreciated fully 30 to 50 per cent. It will always be in need of repairs. The second house, of better construction, is good for from 10 to 15 years, with repairs beginning after the third or fourth year. From then on repairs are an ever increasing, fixed yearly expense. The third contractor, for $3000, has constructed a good frame house that will last from 25 to 35 years. To do this, however, the frame has cost more than concrete. The cost of the other two houses is less than concrete, but in from 5 to 8 years the cost is much more and the difference increasing every year. In addition, there is a depreciation for wear and tear, whereas, the concrete house, like good wine, improves with age.

Brick construction will cost for a 13-in. wall 36 to 50 cents per square foot of wall, and a 9-in. wall will cost from 25 to 35 cents per square foot of wall. To these figures must be added, for the finished wall, cost of furring, lathing and two brown or scratch coats of plaster and the white coat.

Hollow tile construction, which has an advantage over brick by reason of its air space, averages about the cost of brick or a trifle under. In comparing it with concrete, the writer knows of a case in point, where an owner thought the concrete bids were too high and turned to the tile, expecting that the cost with this material would be much lower, as he had been led to believe. The unexpected happened. The hollow tile bids were higher, thus showing that it costs more than concrete.

Concrete blocks, at a less cost, have all the good points of the hollow tile construction and a few more besides. There is nothing better than a concrete block wall, where the blocks are properly made, cured and placed. The difficulty with 90 per cent. of the block houses about which there has been complaint is generally found upon investigation to be defective in the laying up. The public does not know this and at once condemns all concrete blocks as bad, when even a poor block will give a fairly good result, if the mason will only do his work right.

The cost of block construction is from 18 to 35 cents per square foor of wall having a thickness of 8 to 12 in., inclusive. For the finished wall add the cost of the white finish coat, which is put directly on the concrete, thus saving the cost of furring, lathing and the two brown or scratch coats of plaster. Blocks are condemned by many because the outward appearance does not appeal to them. Architects say that the rock face is a bad imitation and inartistic. Admitted, but 90 per cent. of the people who use them choose this surface. It is also claimed that, as the blocks are so regular in size, it gives the building a look of sameness. This can also be said of brick.

All of these arguments can be met by making a block of coarse materials with a very rough surface and by laying them up without pointing the joints. Then rough casting the wall to any surface desired. A rough stucco or pebble dash wall is always acceptable to the architect. By this method you have not only completely changed the appearance, but you have done this without losing even one of its good features and at a less cost. I believe this method to be the cheapest in the block business.

A plain or reinforced concrete wall is much stronger in every feature than a brick wall. It is, therefore, not necessary to make the concrete wall as thick in order to get the proper factor of safety. The Philadelphia building laws take cognizance of this fact by requiring in concrete only two-thirds of the thickness called for in brick.

For house construction I would advise two 4-in. walls, with a 4-in. air space. The two walls should be tied with metal ties in concrete webs. This gives a wall of full strength, saves materials, gives an absolutely dampproof house and all the benefits derived from the 4-in. air space. It also saves the furring, lathing and two brown coats of plaster, the finishing coat being plastered on the concrete. This wall will cost from 15 to 25 cents per square foot of wall, plus the finish coat.

Construction for Two Story House.

Another method is to use a 6-in. wall, which is strong enough for any two-story house, with furring, lathing or Hy-rib metal sheathing on the inside, which gives enough air space to keep any dampness from coming through. Plaster in the regular way with two brown coats and one finish coat. This will cost from 11 to 18 cents per square foot for the concrete, plus the furring, lathing and plaster. These prices are equal to $6 to $10 per cubic yard for concrete.

Concrete partitions 2 in. thick—reliable in every way, nothing better—can be put up for 16 to 20 cents per square foot. Floors, by using concrete in connection with hollow tile, can be placed for about 25 to 40 per cent. more than the wooden joist construction we are now using.

A concrete roof costs but a few dollars in excess of what we are paying for the best wooden shingles. After we have these things we have a structure which does not require any painting, repairs or outlay of any kind. We have a fireproof house which does not depreciate, but rather increases in value. It saves the large insurance expense and fuel. It is a delight to the owner, because it is cool in summer and warm in winter.

To reduce the cost of construction of the small reinforced concrete building, a method must be applied that is at once simple, quick, practical and economical. The system which is economical for the large structure is too high in cost for the small structure. During the past summer the writer constructed a stable for Robert E. Griffith at Haverford, Pa. The outer walls and partition walls were 6 in. thick. They were all carried up at the same time as a unit. To do this we used two rounds of 12-in. boards inside and out, fastened with the Dietrich clamps. The result obtained was quick construction, which means a saving of labor, economical use of lumber and a minimum cost which was in this case $1580, as compared with a bid for brick of over $2500 and for frame of $2000. The lumber used for forms and scaffolding was all utilized in the carpenter work, thus there was no waste.

Where the form is a part of the builder's permanent equipment, to be taken from job to job, I would suggest units 8 ft. long by 3 ft. wide. When two rounds of 12-in. board units are used it often happens that the placing of concrete is delayed owing to the men changing forms and not being able to keep ahead of the mixing. By using two rounds of the 8 x 3 ft. units, which are easy to handle and cost no more to place than the one-board units, two men changing forms can keep ahead of six men mixing and placing. This gives the concrete a longer time to set before the forms are taken off.

If care is taken in placing the concrete there are no surface voids, and it will leave a smooth wall for any of the many different finishing methods we may wish to apply.

The method giving the best result for the least work is by thoroughly wetting the walls and then applying with a brush a thin 1-2 mortar, rubbed in well with a carborundum stone. This produces a lather on the surface, removes all board marks and fills the pores. Before dry go over the wall with a brush dipped in water. The result is a hard, smooth, even surface and uniform in color. A green wall can be done in the same way.

In conclusion I would like to refer to the problem of satisfactory treatment of concrete houses from the architect's point of view. The leading architectural magazine in this country recently sent out a circular in which the following statement appeared:

"There is no reason in the world why even the suburban residence or farmhouse should be a hodge podge of irrelevant architectural details, inclosing a sorry assortment of poor and, therefore, uneconomical construction and equipment. The sad, costly, architectural aberrations which line even the main thoroughfares of our leading cities are the gratuitous insults of ignorance. Nobody means offence, nobody wilfully chooses the poorer results, but it is not to be avoided when the worse appears the better reason. We need a united effort for reformation. We need to establish a fair average of critical judgment. We do not need an artistic police, but we need an artistic school for art."

We, as cement users, can derive great satisfaction in knowing that the condition of affairs as described by this high authority in the domain of architecture cannot be charged to builders of concrete houses, as the latter are so much in the minority that the criticism quoted could not apply to them. But it brings up something for future consideration along the line recently suggested in the editorial columns of one of the leading New York engineering journals. In urging that we substitute fireproof construction for the dangerous and combustible materials usually found in dwellings of moderate cost the editor stated that the objection to concrete might, after all, be due to the fact that we have not become familiar with it, rather than to any intrinsic fault in the material itself. It is my conviction that the people will learn to admire and come to like the plain and simple concrete house, just as they have learned to appreciate many other plain and useful things that former generations regarded as incomplete unless profusely carved and ornamented.

To illustrate my meaning, the modern steel railroad coach with its cement floor might serve as an example as opposed to the highly varnished and overornate style of car that preceded it. We find the trend of critical taste already pronounced in this direction, and it will not be long before public taste will follow, with concrete affording unexampled opportunity to exemplify it in attractive and indestructible dwellings of moderate cost.

WHAT will probably be the largest garage in the city of New York has just been designed for erection on the New York Central Railroad's right of way, west of West End avenue, extending through the block from Sixty-sixth to Sixty-seventh streets. It will have a frontage of 289 ft. and a depth of 200 ft., and is estimated to cost $560,000. It will contain a warehouse and factory in connection with the garage department, will be of four stories in hight and constructed of reinforced concrete.

The Cement Industry in 1908.

An estimate by Edwin C. Eckel of the United States Geological Survey indicates that the production of Portland cement in the United States was somewhat less than 40,000,000 barrels. This compares as follows with the output of recent years:

	Barrels.
1905	35,246,812
1906	46,463,424
1907	48,785,390

The falling off from the output of 1907 was heavy, and is particularly notable because it is the first decrease shown in any year by the American cement industry. The decrease was not uniformly distributed throughout the country, for New York, Pennsylvania, and New Jersey will probably show the highest percentages of loss, while in some portions of the West and Middle West the decrease was relatively slight.

During the year several small companies went into the hands of receivers, and the financial stress also led to a change of control in a group of plants operating chiefly in the Pacific States. A fortunate effect of the depression was that it put a stop, temporarily, to the flotation of fraudulent or doubtful cement securities; though it is likely that with improvement in general business conditions promotion schemes will again be taken up on an even larger scale than before the depression.

The year 1909 opens with heavy stocks of cement on hand at most mills, but with good prospects for a steady though slow revival in the cement trade. It is unlikely that this revival will be sufficiently rapid to push mills to their capacity during the year, and it is, therefore, possible that the high record for output made in 1907 will remain unbroken for another year at least. The total maximum capacity of existing plants is now about 60,000,000 barrels a year.

Architectural Competition for San Francisco City Hall.

The San Francisco Board of Public Works has approved of the plan of City Architect Tharp of that city to offer prizes aggregating $15,000 in a worldwide competition for designs for the new city hall, which will replace the one destroyed by the great fire of April 18-21, 1906. These prizes are exclusive of a fee of about $80,000 net, which will go to the successful architect. There will be three prizes of $2500, $1500 and $1000, respectively, awarded to the three plans of greatest merit not accepted, and 10 awards of $1000 each to be paid to as many efficient architects to insure their participation in the competition, none of these 10 to receive either of the three prizes.

The plans of all participants are to be submitted anonymously according to the rules adopted in the United States competitions for post offices and other public buildings. The successful designer will be allowed six months after the award is made to complete his working drawings.

The building is to cost $3,750,000 and two general alternative schemes are suggested. The first is a group of buildings adapted to the triangular city hall site and of moderate hight, probably about five stories. The second is a monumental building, broad at the base with a central massive tower structure of imposing hight, probably 20 stories. Competitors may submit plans according to either of both conceptions.

Light California granite for the basic structure, with Indiana, Wyoming or Utah limestone or sandstone for the upper stories, or a suitable California stone to be found, are the materials suggested for the exterior. A steel frame is required, and a total space of not more than 6,000,000 cu. ft. recommended. A cost of about 60 cents per cubic foot is estimated, leaving a reserve of $150,000 for the unexpected.

Design for a Seven-Room House.

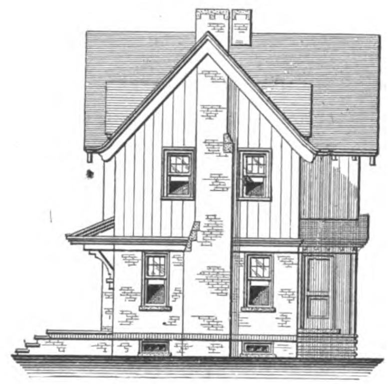
The drawings presented herewith relate to a dwelling intended for a small family in moderate circumstances, the arrangement being clearly indicated on the plans. The exterior is finished somewhat out of the ordinary, having the first story of dark red brick, while the second story, gables and dormers are covered with boards laid vertically and stained a dark brown.

The arrangement shown gives a reception or stair hall 8 x 13 ft., with living room opening from it at the right and dining room at the left. The hall has a finish of boards 10 in. wide, with battens over the joints and treated in dark golden oak. In the living room on the long side is an open grate, and the ceiling is beamed. Communication between the dining room and kitchen is established by means of a good sized pantry, from which lead the stairs to the cellar. There is also an outside entrance to the cellar, as clearly indicated on the plan. The ice box can be placed in the pantry and iced from the rear porch through a slide. The kitchen range is provided with a hood, and is vented to carry off the odors of cooking.

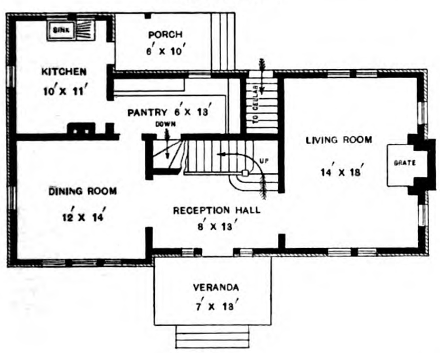
On the second floor are three sleeping rooms, bathroom and commodious closets. The large bedroom at the right has an open grate and two closets at the front. A linen closet is provided just outside the bathroom, and between it and the rear bedroom.

The house here shown was erected for W. G. Cracknell, Buffalo, N. Y., in accordance with drawings prepared by Architect H. J. Kaufman, 411 Third street, Warren, Pa.

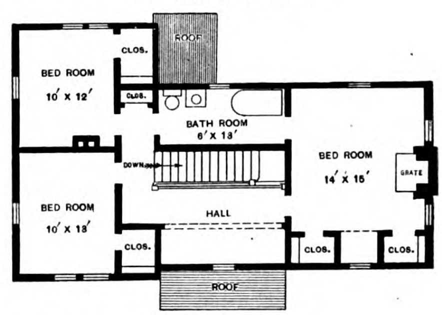
Front Elevation.



Side (Right) Elevation.



First Floor.



Second Floor.

Scale, 1-16 In. to the Foot.

Design for a Seven-Room House.—H. J. Kaufman, Architect, Warren, Pa.

THERE is a somewhat general feeling among local builders that the time is rapidly approaching when all but the very cheapest sort of flat and apartment houses in New York City will be equipped with elevators. Not only are tenants leaning more and more to the idea of the elevator as a necessary part of the equipment of moderate-priced apartments, but builders are beginning to realize that an elevator adds to the value and income-producing power of a house to an extent out of all proportion to its cost.

New York's New Department Store.

The new department store which is to be erected upon what was to have been the uptown terminal of the McAdoo Tunnel system at Thirty-second street and Sixth avenue, Borough of Manhattan, N. Y., will be 10 stories in hight above the sidewalk and three stories below the street level. It will cover a plot measuring 197½ x 400 ft., and the exterior materials will be limestone, terra cotta and brick in combination with the best fireproof methods of construction. The plans were drawn by Architects D. H. Burnham & Co., of Chicago, who also planned the Wanamaker stores in New York and Philadelphia, and the store of Marshall Field & Co., Chicago. The new building will be known as the "Gimbel store," having been designed expressly for Gimbel Brothers, Philadelphia, Pa., and leased to them for a long term of years by the Hudson Tunnel Company. The project is estimated to cost $4,000,000 and will require in the construction of the building something like 12,000 tons of structural material. There will be 41 electric passenger elevators in the building and six freight elevators and the equipment throughout will be thoroughly up to date in all respects. When completed it will rank among the largest store buildings of this character in the city. The general contract for the construction of the building has been secured by the Thompson-Starrett Company, of 51 Wall street.

A LARGE fireproof hotel and studio building to include a roof garden is soon to be erected at a cost of three-quarters of a million dollars in West Seventy-ninth street, just east of Riverside Drive, Borough of Manhattan, N. Y. The building will cover an area of 130 x 102 ft., and according to associated Architects Charles D. Carr and C. C. Wagner will be 10 stories in hight.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - - TREASURER
GEO. W. COPE, - - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

MAY, 1909.

Three Months' Building Operations.

The remarkable and altogether unprecedented increase in the amount of new building projected the country over during the first quarter of the current year as compared with the corresponding period a year ago gives promise of a most active season in all branches of the building industry, provided the bulk of the improvements for which permits have been issued are soon carried into effect. In almost every city of importance the statistics available indicate a gradually expanding volume of operations, especially in the way of housing accommodations, and the same is true in a measure in the suburban and rural sections of the country where dwellings of moderate cost are numerously being erected. The general tendency seems to be to provide home facilities for an increased population for many years to come. Locally there has been in the first three months of the current year a filing of plans for building improvements which is far in excess of the corresponding season last year, and which on its face gives promise of unusual activity in the many branches of trade dependent in large measure upon building operations. In the Borough of Manhattan permits were taken out in the first quarter for 1135 building improvements, involving an estimated outlay of $43,947,350, while in the same three months last year permits were issued for 802 new buildings, additions and alterations estimated to cost $9,732,800. One reason for this tremendous gain in the estimated value of projected operations is found in the unusual filing of permits for housing accommodations in order to anticipate the adoption of the revised building code now under consideration, and which if it becomes a law will make it impossible to erect the now popular type of six-story elevator apartment house unless it be of "fireproof construction." The extent to which filings of this character was carried may be gained from the statement that of the enormous total for the quarter fully $25,000,000 was for tenement houses, the building code designating every structure designed to accommodate three families or more as a "tenement house." In the corresponding quarter last year the permits filed for such buildings called for an outlay of less than $2,500,000. The estimated cost of new store buildings projected in the quarter ending with last month was about $10,500,000 as compared with $3,000,000 a year ago. Very little has been done in the way of new office buildings the last three months, only five permits having been issued, involving an estimated outlay of less than $2,500,000, as against less than half a million a year ago. In the Bronx the record for the quarter is no less impressive, although the figures do not reach such large totals as those above given. The striking feature is found in the permits issued for housing accommodations, both brick and frame. Of the former the new work projected involves an estimated outlay of a trifle over $9,000,000, and of the latter construction something more than a million dollars, while in the first quarter of last year the figures for the two classes of construction were $1,400,000 and $551,000 respectively. It seems to be the general feeling in building circles that while plans have been filed for large blocks of apartment houses, more especially in that section of the city designated as Washington Heights, it will probably be some little time before any large percentage of the work of construction is actually commenced.

Enlarging the Efficiency of Libraries.

It is not at all infrequent at the present day to hear complaints made of the inefficiency of the public library to supply the wants of the building mechanic, the contractor, the architect and the man of business affairs. As a consequence of this condition of things many of the more progressive city libraries of the country are giving increased attention to technical subjects, with a view to covering the leading branches of industry. One which is especially active in this respect is the public library at Washington, D. C. To meet the demands of its patrons for books on trades and handicrafts, engineering, business and industries in general, the Useful Arts Department was organized. About 6000 selected volumes have been procured treating of the various trades and handicrafts, the physical and mathematical sciences on which they are based; on engineering branches, on agriculture, business and the like. Over 160 engineering and trade periodicals, domestic and foreign, are received, the current numbers of which may be used in the library, but the back numbers of which may be taken home. Another important feature is the collection of trade catalogues arranged on open shelves, which the Annual Report shows have been consulted very freely throughout the year. In the libraries in Newark, N. J.; Providence, R. I., and in Pratt Institute, Brooklyn, are found departments similar to that in the Washington Library. It would seem to be advantageous, therefore, that business houses should place all such libraries on their mailing list and see that they are supplied with all catalogues published. This department is well patronized, according to the annual report, and recommendations are made for additional books on designing, decorating, accounting, &c. With the movement thus inaugurated it is safe to say that similar action on the part of public libraries elsewhere would be widely appreciated.

New York's Latest Skyscraper.

One of the latest additions to the colony of towering skyscrapers which thickly dot the lower end of the Island of Manhattan, and which are such conspicuous features of the architecture of the metropolis at the present day, is an imposing 30-story office building just planned for the financial district. While designed by a New York architect, the structure is to be erected by a Southwestern concern for St. Louis interests. The architectural treatment is somewhat unique in that the conception of the designer has been that of a tower rising from a solid base and growing lighter toward the top. This effect is produced by making the wall up to the sixth story a plain surface, but at the sixth floor it breaks into large bays extending through 17 stories to a point where it is again broken into smaller bays, until finally large dormers pierce the roof line. This treatment constitutes briefly the solid base, the shaft and the cap, or crowning *motif*. The ornamentation has been derived from the English Gothic style of architecture, while the color scheme is white throughout, with the roof of copper, which after exposure to the elements for a time will turn a dull green. The new structure will have a base 58 x 82 ft. in plan, will cost $1,500,000, and will occupy the site of the Bryant Block, at the northwestern corner of Liberty and Nassau streets, and adjoining the Chamber of Commerce Building on the east. It will be known as the Bryant Building, taking its name, it is said, from William Cullen Bryant, from whose estate the site was formerly purchased. The design is that of Henry Ives Cobb, whose work in the architectural line is well known throughout the entire country. It is expected that the new building will be completed and ready for occupancy early in the spring of the coming year.

Better and More Permanent Methods of Building Construction.

For the first time in the history of building in the United States there seems to be a spontaneous movement toward better and more permanent methods of construction. Hitherto, except in very exceptional cases, Americans have built in just about as inflammable and unpermanent a manner as the local building regulations would allow, says a recent issue of the *Record and Guide*. In the country districts, except an occasional factory or a handful of millionaires' residences, the houses were of frame construction, even though they might be veneered with brick or plaster. In those cities whose building regulations were lax, people erected even supposed fireproof buildings in a very inferior manner, and there were cases, such as San Francisco, where apartment houses six stories high were wholly of wooden construction. The influence of the fire insurance companies was always exerted in favor of good building methods, but no matter how high were the premiums charged for in wholly inflammable buildings, frame construction was so much cheaper than any better method that the house owner preferred to erect an inflammable building which quickly deteriorated, rather than a permanent fireproofed structure. It is only recently that a better standard of building has been gradually creeping in; at the present time a certain number of houses of different kinds are being erected in an excellent manner, and quite without any added pressure either from building regulations or the fire insurance companies, and this innovation is due apparently to two different but supplementary causes. In the first place, the cost of frame construction has increased, and the cost of fireproof construction has diminished; while, of course, a wooden or a framed house can still be built cheaper than any other, a house owner can sometimes figure that with the saving in insurance and the smaller expense for repairs the difference in cost is not very great. People are beginning to prefer the spending of more money in the beginning, in order to make an ultimate saving. Furthermore, there can be no doubt that a certain number of Americans are beginning to prefer to live in well constructed, vermin proof houses, even though it does cost more. They like the security, the cleanliness, the comparative noiselessness and the sense of permanence which the inhabitant of a fireproof house gets in his residence. These men are usually engineers or technical experts of one kind or another, whose work has taught them the value of permanent methods of construction, and who are interested therein for its own sake. Moreover, the most encouraging aspect of the whole situation is that all the causes contributing to the increase of better methods of construction will become in the future more rather than less effective. The era of very cheap lumber has passed in this country, never to return. Wood will always enter much more largely into American building than into European building, as because of the enormous area of this country a great deal is adapted only to the growing of trees, but timber raised for the market cannot be grown or cut so cheaply as were the original forests. Then methods of fireproof construction will be further improved and cheapened. The large corporations interested in the manufacture of hollow tile and cement will find it very much to their interest to encourage the use of these materials by the thousands of small house builders, and they will understand that to this end their materials must be sold on the lowest possible terms. Finally, public opinion all over the country is being exerted in favor of improved methods of construction, and in the long run the increased demand on the part of the consumer for better built houses is likely to be the most potent cause of all.

Two Southern California Residences.

(*With Supplemental Plate.*)

We have taken for the subjects of our half-tone supplemental plate this month two frame residences of entirely distinctive types of architecture and embodying in their external treatment many interesting features. One of the dwellings has the first and second stories covered with siding and the roofs and gables shingled, while the foundation and porch construction is of imposing masonry. The other residence has a shingled belt course, with the story above and below weatherboarded and an ornamental treatment of the front porch and balcony immediately above it.

Production of Lumber, Lath and Shingles in the United States.

Some interesting statistics relative to the production of lumber, lath and shingles in the United States during the years 1900, 1904, 1905, 1906 and 1907, the only years for which consecutive data are available, are given in a Bulletin just issued by the Bureau of the Census in cooperation with the Forest Service. The figures are based upon reports from many thousands of mills covering every lumber producing region of the United States, the reports for the most part being made by the manufacturers direct to the departments mentioned.

The table presented herewith shows the number of mills reporting and the quantity and value of lumber, lath and shingles in the years named:

Year.	Number of mills reporting.	Lumber. Quantity. M. feet B. M.	Lumber. Value.
1907	28,850	40,256,154	$666,641,367
1906	22,398	37,550,736	[illegible]21,151,388
1905	11,666	30,502,961	445,343,231
1904	19,127	34,135,139	435,708,084
1900	31,833	35,084,166	390,489,873

Year.	Lath. Quantity Thousands.	Lath. Value.	Shingles. Quantity. Thousands.	Shingles. Value.
1907	3,663,602	$10,342,705	11,824,475	$30,111,337
1906	3,812,807	11,490,570	11,858,260	24,154,555
1905	3,111,157	7,777,892	15,340,909	28,380,682
1904	2,647,847	5,435,968	14,547,477	24,009,610
1900	2,523,998	4,698,909	12,102,017	18,869,705

ON the campus at Cornell University, Ithaca, N. Y., is a model rural schoolhouse designed to serve as a suggestion in schoolhouse architecture, and to contain a real rural school as a part of the nature study department of the New York State College of Agriculture at the university. The essential feature of the new schoolhouse is a workroom which occupies one-third of the floor space. The exterior of the building is cement plaster on metal lath, while the interior is attractively treated, the building being intended not as an ideal but as a model. It was constructed after plans furnished by Director L. H. Bailey, who points out that while the prevailing rural schoolhouse is a building in which pupils sit to study books it ought to be a room in which pupils do personal work with both hands and mind. It was a part of his scheme to show that such a building could be afforded by the average rural school district, the cost, of course, varying in different localities.

CORRESPONDENCE.

Criticism of First Prize Design in Bungalow Competition.

From J. E. W., Lowell, Mass.—In the April issue of *Carpentry and Building* you publish the plans winning first prize in the bungalow contest, and while the design on the whole is good, will you please tell me where "Oddity" intends to place the kitchen range so it will not be in the way? I suppose he intends to have the stove pipe enter the chimney on the plan, but that will place the range directly between two doors, which will not be a very convenient arrangement, to say the least, not to mention the awkward way the stove pipe would have to be put up. What do you say, "Oddity"? Where does the range go?

Answer.—The above criticism was submitted to A. H. Fidler, Jamestown, N. Y., the author of the first prize design in question, who replies as follows:

I am very glad to answer the correspondent's question, although I am considerably surprised that doubt should exist in the mind of any experienced architect or contractor with reference to the location of the kitchen range. In planning any type of residence it is always helpful to indicate in pencil on the plans the location of the larger and more important pieces of furniture in the various rooms, in order that their relation to each other and to the room may become apparent and errors avoided. This is especially important in planning a bungalow where the utmost care must be used that no floor space be wasted. By adhering to this rule the architect will not as a general thing be required to explain why he failed to provide a well lighted and convenient place for the kitchen stove; why the sideboard, if there be one, must stand in front of a window, or why in a bedroom no suitable place was planned for so necessary an article as a bed.

In planning the bungalow in question I followed the rule above stated. The range was intended to stand in the jog against the wall between the cellar and pantry doors. The location of the thimbles is distinctly marked upon the plans, which are perfectly and artistically reproduced in *Carpentry and Building*.

The space allotted to the kitchen range is about 5 ft. 6 in. wide, which is ample space for a range to be used in a house of this type. The thimbles, coming directly above this floor space, would seem to leave no doubt as to where the range should stand. If any other point has been left in doubt I shall be glad to explain more fully at any time.

Shading Drawings of Elevations of Buildings.

From R. W. M., Uniontown, Pa.—Occasionally in making a drawing of the elevation of a building from a plan it is necessary to represent a circular recess similar to that indicated in the accompanying sketch. Now, what I want to know is how to put the vertical or shade lines into the portion of the building around the window so as to make it appear circular—that is, concave in the elevation; also how to make it appear convex.

Answer.—We have reproduced in Fig. 1 of the annexed illustrations the plan submitted by the correspondent above. What he really wishes, no doubt, is an explanation of the rules governing the shading of mechanical drawings as a means of giving elevations an artistic or pictorial appearance, as, for example, when finely finished drawings are desired for show purposes. The main idea embodied in conducting such work may be gained by observing the effects of light and shade as they exist in nature. This may be illustrated by making the following simple experiment: Fold a piece of paper or cardboard with two or more parallel folds, all made in the same direction, simulating the external appearance of a bay window or octagonal column, and stand it up where it will be strongly illuminated by diffused light coming from one direction only, as near a window, as indicated in Fig. 2, and study the light effects upon this object. It should be so placed with reference to the observer and the light that the light shall fall slantingly downward upon it somewhat from one side, preferably the left, but not from behind the observer. Daylight coming through a window is better than artificial light, except the latter be within a translucent globe which will diffuse the light and prevent sharp shadows, and all other sources of light in the room should for the time being be screened.

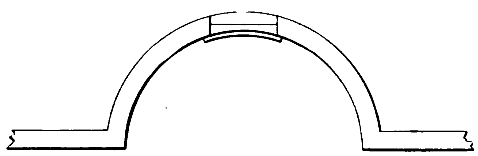


Fig. 1.—Plan of Concave Wall as Contributed by "R. W. M."

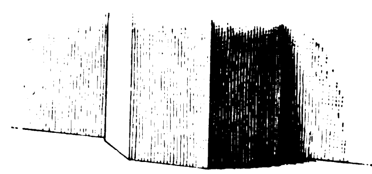


Fig. 2.—Showing Effect of Light and Shade Upon an Object Having Oblique Surfaces.

Shading Drawings of Elevations of Buildings.

It will under these conditions be noticed that the side of the subject which is turned most directly toward the light will be most strongly illuminated, while the adjoining surface upon which the light falls more obliquely will appear gray in tone, and that those surfaces turned still further away from the light will appear still darker, the face furthest from the light usually receiving some light reflected from the background or the side wall of the room which is opposite the window, all with the general effect shown.

If instead of the folded paper a cylindrical surface, as a paper tube, be substituted the light conditions above described will produce instead of several tints a gradual increase of shade as the side furthest from the window is approached. Again, if the paper tube be now cut in two vertically and the forward half be removed, thus presenting a concave surface to view, the light and the dark sides will be seen to have exchanged positions, the strongest light now being near the right side.

The key to the artistic representation of form, aside from the matter of outline, is to produce upon a flat surface the same effect of light and shade which naturally would be produced upon the object itself were it in existence, or, in other words, to simulate nature. In mechanical shading, however, certain conventionalities have been adopted whereby no mistake can be made in regard to what is meant. To this end the light is supposed to fall upon the subject being represented from the upper left side, or, in other words, to fall downward over the left shoulder at an angle of 45 degrees, with a consequent result that every projecting part of a subject will appear darker on its right and lower side, and when cast shadows are introduced they will fall downward to the right.

This idea is carried out in drawings which are strictly in outline by means of what are termed "shade lines," by simply making the outlines upon the right and lower sides of any projecting part heavier than those upon its light sides. In the case of a sunken portion the surrounding surface becomes the projecting part and the position of the shade lines thereby becomes reversed.

RESIDENCE OF MR. S. C. KRONNICH, LOS ANGELES, CALIFORNIA

FRAME DWELLING OF MR. M. N. AVERY, LOS ANGELES, CALIFORNIA

Two Southern California Houses

J. B. BOURGEOIS, Architect

Supplement Carpentry and Building, May, 1909.

Thus if a figure of rectangular outline have its upper and left outlines made heavy it is understood to indicate a sunken panel or opening, as a window, while if the heavy lines be at the right and below, the included space indicates a projection. This method is employed in all drawings made for the Patent Office as well as in mechanical drawings made for illustrative purposes, and may be supplemented by more elaborate shading if desired, as shown in Figs. 3 and 4.

In more fully shaded drawings the shade or "tint," as the engraver terms it, is produced by drawing lines of such uniform width and intervening space that the lines are practically lost to the eye, the remaining effect being that of a tint made by means of a "wash" of India ink or water color. Such a tint is termed a "flat tint," and may be used to represent a flat surface, being made darker or lighter as occasion requires, as already shown in Fig. 2.

When a rounded surface, either convex or concave, is to be shaded, the graded tint necessary to such representation is produced by drawing the lines wider and spacing them closer together where the darkest shade is required, decreasing the width of the line and increasing the width of the space with uniformity till the lightest part is reached, being careful to place the light and dark sides in natural order, as explained above.

In Fig. 3 we show a shaded elevation of the concaved recess represented by our correspondent's plan, Fig. 1, in which the arrow in the plan shows the direction of the light, and in Fig. 4 the manner of shading a swelled or convex facade, the plan being placed immediately below it.

It is understood, of course, from the foregoing that light falls upon the subject in parallel rays, the arrows in the plan being so located as to indicate the portions of the cylindrical surface which are under the strongest illumination. Those portions of the surface represented in the elevations which are directly above the points on the wall ahead of the arrows of the plan will therefore be left white and form what in artistic parlance is termed "high light." Inasmuch as the light is represented as falling in the direction of the arrows, it will be noted in Fig. 4, for example, that the surface of the cylinder curves away from the light toward the left of the high light as well as toward the right, and that therefore some tint or shading should appear on the left edge of a convex surface. For a like reason some shading should also be shown at the right of the high light in the representation of a concave surface, as in Fig. 3, all tints becoming lighter as the high light is approached.

In the matter of reflected light above referred to, it is a law of nature that, the color of all parts being the same, a cast shadow is darker than the shaded side of an object, and since that portion of the background not in the shadow as well as other nearby objects must be under the same light as the subject being represented, such objects will naturally reflect some light in a direction opposite that of the principal light and, as it were, illuminate the dark side of the subject. Such light has not only a marked artistic value in that it relieves a picture of a somberness of tone and an expression of heaviness which it would otherwise have, but also a practical value in adding definition or clearness to those parts in shadow.

The reflected lights are shown in Figs. 2 and 4 and become a necessity when cast shadows are introduced, which shadows in themselves have great value in adding to the realism of the representation. In the shading of a concave surface it is not usually necessary to consider the reflected light, since under ordinary conditions there is no adjacent dark surface requiring demarcation.

Some distinction may be observed between the treatment of a concave and that of a convex surface. In the case of the former a smaller high light may be left and somewhat less contrast be made between the lighter and the darker portions of the shade, thus giving the idea of a recess by the general dark gray tone, while a convex surface should be characterized by a generally lighter tone and brilliancy of contrast.

It may be noticed that in Figs. 3 and 4 the position of the shade lines in the plans does not correspond with the direction of the light as indicated by the arrows. The reason for this may be interesting in view of the fact that there are two systems of shading. A plan is defined as a projection of an object upon a horizontal plane—that is, it represents the object as seen from above —while an elevation is a projection made upon a vertical plane. The surface of the paper being of itself one plane, thus represents in one part a vertical plane and in another part a horizontal plane. According to the methods of descriptive geometry the perfect representation of an object calls for projections in three planes, two vertical planes at right angles to each other and a horizontal plane at right angles to both, such views being designated as front and side, or as side and end elevations, and plan or top view. Two of these views are supposed to be hinged, the end or side view upon a vertical and the other, the plan, upon a horizontal line or hinge, and both to be turned upon their hinges until all views are brought into the same plane. In Figs. 3 and 4 the upper edge of the plane of the plan may be supposed first to have intersected the plane of the elevation along its bottom edge and afterward to have been hinged or swung into a vertical plane, thereby bringing the subject as represented in the plan under the same light as that falling upon the subject as represented in the elevation. The consequent result of this arrangement is that all shadows in the plan will then fall downward to the right, as in the elevation, the arrow in the plan being used simply to indicate how the light should fall in the elevation.

The system as above explained thus really supposes the object itself to be revolved into three or more positions, according to the number of elevations required, all positions being thus brought under the same light.

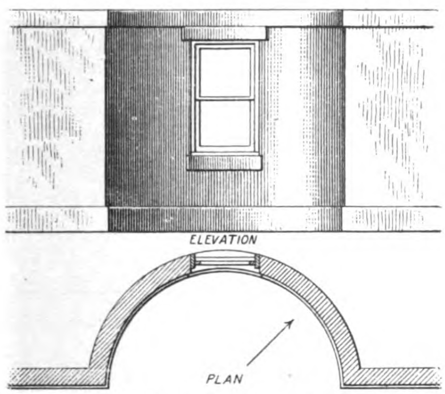


Fig. 3.—Showing Method of Shading a Concave Wall Surface.

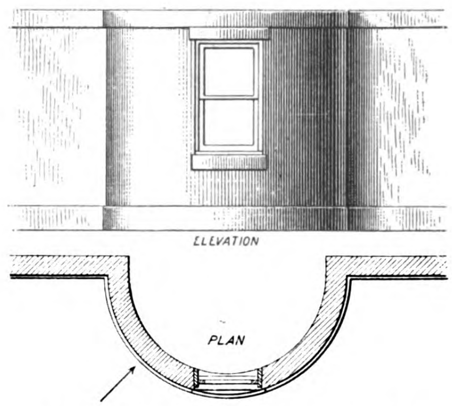


Fig. 4.—Method of Shading a Convex Surface.

Shading Drawings of Elevations of Buildings.

Another system of lighting supposes the subject to remain fixed in one position, while the observer changes his position in viewing each side. In such a system it will be seen that in the principal elevation only the light would fall downward to the right, while when the subject is viewed as shown in the elevation of the left end or side the light will be represented as falling downward toward the left, the elevation of the right side, as well as that of the rear, if one is required, will all be in shadow and in the plan the light will appear to fall upward to the right, as indicated by the arrows in Figs. 3 and 4.

Both systems are logical and the latter method will be found principally in the work of foreign draftsmen.

GEORGE W. KITTREDGE.

The "Sectorian" System of Handrailing.

From Morris Williams.—Answering the correspondents, "J. E. N.," Leland, Ill., and "D. M. R.," Michigan, who inquired about the above subject, I would say the system or "scheme" for laying out wreath rails is closely related to a very old contrivance known by the name of the "tangent box system" practiced by our great-grandfathers when the science of handrailing was in its infancy. What in the "Sectorian System" is incorrectly called "sector" is merely the old-time "tangent box," by the use of which the old stairbuilders contrived to obtain the developments of tangents, face molds and bevels for wreath rails.

The tangent box scheme did produce correct developments in each case, but while the Sectorian System may by rigorous carefulness in the operation produce correct development of tangents and bevels, it will not produce a strictly true geometrical face mold, because the face mold, according to this scheme, in all examples of construction is struck from a center, and is therefore composed of parallel arcs of two circles, when it should, in order to be correct, consist of portions of ellipses.

To show how the Sectorian Scheme is operated, we will take for an example the construction of the wreath over a cylinder placed between two flights connecting with a half space landing platform. A partial plan is presented in Fig. 1 of the diagrams where the landing and the starting risers are shown to be placed in the springing at *a* and *b*, respectively. Revolve the side tangents *a* and *b* to align with the crown tangents as shown at *a'* and *b'*. Upon *a'* erect the line *a' a''* equal in hight to the depth of one riser. At *b'* place the pitch board of the flyers and continue the pitch from *b'* to *a''* over and above the cylinder.

This pitch line represents the elevation of the cylinder tangents, and as shown they are all equally inclined.

At *c'* is shown where the two wreaths are jointed above the crown of the cylinder. The top wreath will reach from *c'* to *a''* and the bottom one from *c'* to *b'*. The operation here shown is common to all systems of handrailing.

The geometrical principle, common to all true and correct systems of handrailing to develop the face mold, is shown for the upper wreath in the diagram. Draw a line from *n* perpendicular to the pitch line *a'' c'*; place one leg of the compasses in *m* and extend the other to *c'*; turn over to cut the line from *n* in *c''*. Connect *c''* with *m*, and at *m* will be found the angle required between the tangents upon the face mold.

The center line of the wreath is shown extending from *c''* to *a''* and to be a portion of an ellipse.

The Sectorian Scheme is based on the presumption that even such a simple process as above described is too intricate for an ordinary mechanic to comprehend, and presents in its stead the method illustrated in Figs. 2, 3, 4, 5 and 7 of the diagrams. Fig. 2 is what is called the "sector," being two boards hinged together. An end section of it is shown in Fig. 3.

Upon the face of the sector when it is open, as indicated in Fig. 2, is marked the pitch of the two tangents of the wreath as indicated from *c'* through *w* to *b'*, and it is obtained from the elevation, Fig. 1, where it is shown to be the pitch of the two bottom tangents *c' w* and *w b'*.

After drawing the pitch of the tangents upon the

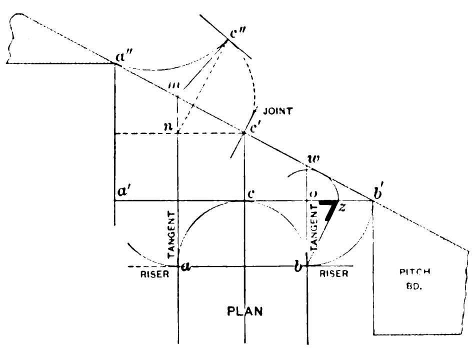
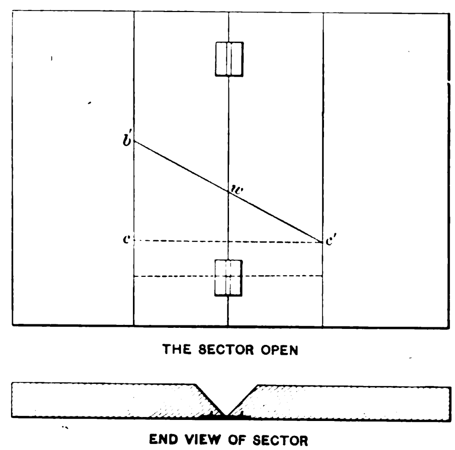


Fig. 1.—Plan and Elevation of Tangents for a Wreath Over a Half-Space Platform Cylinder.



Figs. 2 and 3.—Views Showing Face and End of Sector.

The "Sectorian" System of Handrailing.—By Morris Williams.

sector as in Fig. 2, the next process will be to close the sector to an angle corresponding with the angle of the plan tangents. In this case it will be a right angle as shown on the plan, Fig. 1.

Now place the sector on its edges as indicated in Fig. 4. The pitch line *c' w b'* of Fig. 2 will now appear upon the sector Fig. 4 as at *c' w b'*, a position similar to a hip and valley when two roofs intersect at the corner of a building.

Now place what is known in the Sectorian System as a "tangent" bevel upon the sector, as shown, having the "stock" upon the line *c' w* on one side and the blade upon the line *w b'* on the other. The stock and blade of the bevel when in this position astride the sector will incline sidewise. How much each one inclines may be known by the application of what is known in the sectorian nomenclature as the "spring and plumb bevel," which is shown at *z* in Fig. 4 applied to the stock of the tangent bevel.

To apply the spring and plumb bevel correctly its stock must be directed at right angles to the line *c' w* and its blade following closely the side of the tangent bevel. Such is the method of the Sectorian System to find the bevels to twist the wreath.

In Fig. 1 the same spring bevel or angle is shown at *z* and to have been found by merely extending the compasses from *o* to touch the tangent line *w b'*, turning over to *z* and connecting *z* with *b'*, which is much more simple and assures unfailingly a correct geometrical solution.

In Fig. 5 is shown the Sectorian Scheme of laying out the face mold. The tangent bevel is taken from the sector, Fig. 4, and laid flat on a piece of board, when it will appear as in the upper portion of the illustration. By drawing a line along its inside the angle required between the tangents upon the face mold is found as shown at *w*. Make *w c′* and *w b′* in Fig. 5 equal to *w c′* and *w b′* of Fig. 1. Draw the joints at *c′* and *b′* square to the tangents, and continue each joint to meet in the point *o*. Now place the width of the rail at either joint, and from *o* as center draw the inside and outside curves, thus completing the face mold.

According to the Sectorian Scheme the spring and plumb bevels which are used to square the wreath are applied from the bottom face as shown in Fig. 5. In all true geometrical systems of handrailing they are applied from the top face and right through the center of the joint and plank.

The difference in the application of this bevel is shown in Fig. 6. The stock of the bevel is shown in the left hand portion of the diagram to be placed parallel with the joint on the top face of the plank and the blade right in the center of the joint and plank. Then a section of the rail is drawn square to the blade and around the center point of the plank.

In the right hand portion of the diagram, Fig. 6, the stock of the bevel is shown according to Sectorian System applied to the bottom face of the plank, and the section of the rail to be drawn square from the blade.

It will be observed that the two methods of application will produce the same twist in the wreath, but while the method of the Sectorian System as shown in the right hand portion of Fig. 6 ignores the center point of the joint and plank, the method shown in the left hand portion of the diagram uses this point as the prime factor in the operation. This is done because the wreath to be correctly twisted must have its center coincide with the center of the plank, which can be correctly accomplished by this method without the falling molds, while on the other hand the falling molds are indispensable to the method as presented in the Sectorian System.

In Fig. 7 is shown how to draw the falling molds for both the inside and outside of the wreath, illustrated in Fig. 5. It is accomplished by drawing the stretchout length of each plan curve, as indicated in Fig. 7 at *m n* for the outside and at 1 2 for the inside. To find these lengths place one leg of the compasses in *x* on the outside of the plan rail; open it out to the opposite point and turn around to *o*. From *o* draw a line through *x* to *n* and from *n* draw a line tangent to the curve at *m*. Then the length *m n* will indicate the exact stretchout length of the outside curve represented from *m* to *x*.

Again place one leg of the compasses in *z* on the inside curve, open it out to the opposite point and turn over to *w*. From *w* draw a line through *z* to 2, connect 2 with 1, then the line 2 1 will indicate the stretchout length of the inside curve shown in plan from *z* to 1.

The falling molds are drawn directly above this quadrant plan curve as shown in diagram B for the inside mold, and in diagram C for the outside mold. The hight of each mold as shown from 3 to 4 is to be made equal to the hight the wreath rail is to rise. In this case it is to rise the hight of half a riser, as represented in Fig. 1 from *c* to *c′*. The distance from 3 to 2′ of the inside falling mold is made equal to the stretchout 1 2 of the inside plan curve. By connecting 4 to 2′ and drawing parallel lines to equal the thickness of the rail the laying out of the falling mold for the inside is accomplished.

For the outside mold the line 3 3′ shown in diagram C should equal the stretchout length of the outside plan curve of the wreath shown in plan in Fig. 7 from *m* to *n*, the hight 3 4 being the same as for the inside—namely, the hight of half a riser. The mold is completed by drawing lines parallel with 4 3′ of diagram C at distances from each other equal to the thickness of the rail. These molds according to the Sectorian System are to be applied to the inside and outside of the wreath as guides in working it to the proper thickness. In all other systems the guide by which to work is the center of the plank at each end and the minor axis, thus dispensing with the need of falling molds.

It will be observed from what has here been said regarding the Sectorian System that it is more of a manual scheme than it is a scientific system, and therefore it should not be considered worthy of the time required to master it.

On the other hand, by mastering the articles now appearing in this best of all trade magazines in this or any other country under the head of "Some Problems in Stairbuilding," the science of handrailing may be so thoroughly understood as to make all systems easily comprehended, as the articles contain the fundamental principles of all correct systems of handrailing.

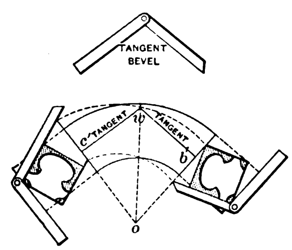


Fig. 5.—Sectorian System of Laying Out Face Mold and the Application of the Bevels and Mold to the Wreath.

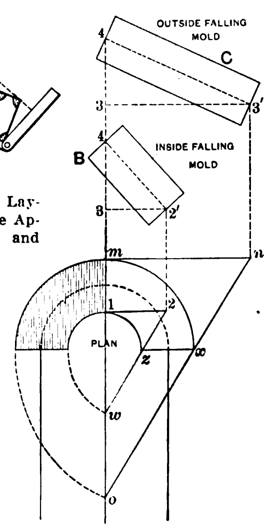


Fig. 7.—Showing How to Lay Out Falling Molds.

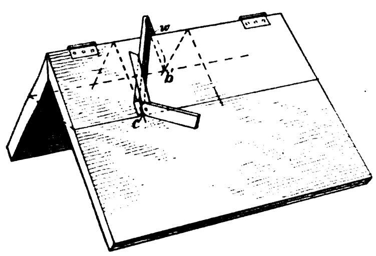


Fig. 4.—Showing "Sector" in Position to Apply the Tangent and Spring Bevel.

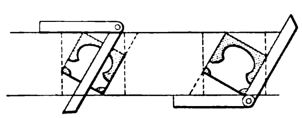


Fig. 6.—Contrasting the "Sectorian" Method of Applying Spring Bevels with All Other Systems.

The "Sectorian" System of Handrailing.—By Morris Williams.

Meaning of Numbers as Applied to Wood Screws.

From J. C. W., Berlin, Pa.—Would you please explain through the Correspondence columns of *Carpentry and Building* the meaning of the numbers as applied to wood screws? Do they refer to the size of heads or thickness? I have asked hardwaremen and they are unable to tell me. Nails are given by "penny," which was explained some time ago in the paper, and I would like to see an explanation along the same line in regard to screws. To some this may be a simple question, but to my mind there are more users of screws who do not know than there are who do.

Answer.—The numbers as applied to wood screws indicate the gauge of wire of which they are made, therefore their thickness. The American screw gauge is based upon and is an outgrowth of the English gauge, which has been in use for so long a time that it is probable no one could give any very satisfactory information regarding its origin. The difference in the sizes of the English gauge, however, is not the same in all cases, while the American gauge is systematical—the difference between each two successive sizes being 0.01306 in.

Tables of Board Measure.

From Jack Plane, Portland, Ore.—In the February issue of *Carpentry and Building* "L. K. L.," San Francisco, Cal., makes request for tables of board measure giving the contents of fractional thicknesses of lumber, such as 1¼ in. and 1½ in. in short lengths. In compliance therewith I have compiled the following tables, which I think will supply his needs, and also be of benefit to many other readers of this paper.

Material 1¼ In. Thick.

Length in feet.	1 in.	2 in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.	12 in.
1	.10	.21	.31	.42	.52	.63	.73	.83	.94	1.04	1.15	1.25
2	.21	.42	.63	.83	1.04	1.25	1.46	1.67	1.87	2.08	2.29	2.50
3	.31	.63	.94	1.25	1.56	1.87	2.19	2.50	2.81	3.12	3.44	3.75
4	.42	.83	1.25	1.67	2.08	2.50	2.91	3.33	3.75	4.16	4.58	5.00
5	.52	1.04	1.56	2.08	2.60	3.12	3.64	4.16	4.68	5.21	5.72	6.25
6	.63	1.25	1.87	2.50	3.12	3.75	4.37	5.00	5.62	6.25	6.87	7.50
7	.73	1.46	2.19	2.91	3.64	4.37	5.10	5.83	6.56	7.29	8.02	8.75
8	.83	1.67	2.50	3.33	4.16	5.00	5.83	6.66	7.50	8.33	9.16	10.00
9	.94	1.87	2.81	3.75	4.68	5.62	6.56	7.50	8.43	9.37	10.31	11.25
10	1.04	2.08	3.12	4.16	5.21	6.25	7.29	8.33	9.37	10.41	11.45	12.50
11	1.15	2.29	3.44	4.58	5.73	6.87	8.02	9.16	10.31	11.45	12.60	13.75
12	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50	13.75	15.00
13	1.35	2.71	4.06	5.41	6.77	8.12	9.47	10.83	12.18	13.53	14.89	16.25
14	1.46	2.91	4.37	5.83	7.29	8.75	10.20	11.66	13.12	14.57	16.03	17.50
15	1.56	3.12	4.68	6.25	7.81	9.37	10.93	12.50	14.05	15.62	17.18	18.75
16	1.67	3.33	5.00	6.66	8.33	10.00	11.66	13.33	14.99	16.66	18.32	20.00
17	1.77	3.54	5.31	7.08	8.85	10.61	12.39	14.16	15.93	17.70	19.47	21.25
18	1.87	3.75	5.62	7.50	9.37	11.25	13.12	15.00	16.86	18.74	20.61	22.50
19	1.98	3.96	5.93	7.90	9.89	11.87	13.85	15.82	17.80	19.78	21.76	23.75
20	2.08	4.16	6.25	8.33	10.41	12.50	14.57	16.66	18.74	20.82	22.90	25.00

Material 1½ In. Thick.

Length in feet.	1 in.	2 in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.	12 in.
1	.13	.25	.38	.50	.63	.75	.88	1.00	1.13	1.25	1.38	1.50
2	.25	.50	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
3	.38	.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50
4	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00
5	.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25	6.88	7.50
6	.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00
7	.88	1.75	2.63	3.50	4.38	5.25	6.13	7.00	7.88	8.75	9.63	10.50
8	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00
9	1.13	2.25	3.38	4.50	5.63	6.75	7.88	9.00	10.13	11.25	12.38	13.50
10	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50	13.75	15.00
11	1.38	2.75	4.13	5.50	6.88	8.25	9.63	11.00	12.38	13.75	15.13	16.50
12	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00	16.50	18.00
13	1.63	3.25	4.88	6.50	8.13	9.75	11.38	13.00	14.63	16.25	17.88	19.50
14	1.75	3.50	5.25	7.00	8.75	10.50	12.25	14.00	15.75	17.50	19.25	21.00
15	1.88	3.75	5.63	7.50	9.38	11.25	13.13	15.00	16.88	18.75	20.63	22.50
16	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00	24.00
17	2.13	4.25	6.38	8.50	10.63	12.75	14.88	17.00	19.13	21.25	23.38	25.50
18	2.25	4.50	6.75	9.00	11.25	13.50	15.75	18.00	20.25	22.50	24.75	27.00
19	2.38	4.75	7.13	9.50	11.88	14.25	16.63	19.00	21.38	23.75	26.13	28.50
20	2.50	5.00	7.50	10.00	12.50	15.00	17.50	20.00	22.50	25.00	27.50	30.00

As will be seen, in both of these tables the amount of board measure is shown in feet and hundredths for lengths from 1 ft. to 20 ft., and from 1 to 12 in. in width. By reversing the operation and reading across the top for the length and down the side for the width, the contents will be given for any width up to 20 in., and any length not exceeding 12 ft.

As shown in the first table, the material contained in the small glass door, mentioned by "L. K. L." measuring 7 lineal feet of 1¼ x 3 in. amounts to 2.19 ft. board measure.

From A. C. J., Mechanicville, N. Y.—I note an inquiry from "L. K. L.," San Francisco, for a table of board measure which will give the number of feet in material 1¼ in. and 1½ in. thick. He says the tables published in book form never give the thicknesses, 1¼ in., 1½ in. and 1¾ in., and that they do not commence with short lengths. In reply I wish to say that if he will secure a copy of "Chapin's Lumber Reckoner" he will find stuff calculated as follows:

1 x 1¼ in.	1 x 5¼ in.
1 x 1½ in.	1 x 8¼ in.
1 x 1¾ in.	1 x 9¼ in.
1 x 4¼ in.	4¼ x 6½ in.
1 x 4¾ in.	4¼ x 9¾ in.

in fact, every size he is likely to require and in lengths from 3 in. to 20 ft. and from 1 x 1 in. to 15 x 15 in.

He will also find a table of timber reduced to board measure from 2 x 2 in. to 30 x 30 in., and from 3 in. to 50 ft. in length; also logs reduced to board measure from 10 in. diameter to C0 in. diameter, and from 10 to 50 ft. in length. I am surprised that more mechanics do not know of this handy little book. My copy reached me as a premium as a new subscriber to the *Woodworker.*

Trouble with a Secret Box Gutter.

From W. S., Moberly, Mo.—A friend of mine has a two-story brick building, 50 x 80 ft. in plan, with a 10-ft. mansard roof, the top of which is covered with tin, while the rest is covered with slate. There is a secret box gutter at the lower edge of the slate, varying in width on the bottom from 12 to 20 in., covered with tin and extending all the way around on four sides. The depth of the gutter varies from 1 in. on the east end to 8 in. on the west, where down spouts are placed. There is not sufficient fall to carry off all the water, consequently for almost half the length of the gutter there is all the way from ½ in. to 1½ and 2 in. of water standing in the gutter after a rain, and, of course, the same thing happens after a freeze and thaw. This is very bad on the tin, and, as a matter of fact, leaks are bound to occur.

I will consider it a very great favor if some of the practical readers of *Carpentry and Building* who have had experience of this kind will suggest a remedy without tearing out the gutter. How would copper answer under such conditions, or would it be no better or safer to resist expansion and contraction than tin?

I would also be pleased to have the opinion and advice of builders who have had practical experience in using sheet lead in gutters of similar construction, and how that metal would stand the freeze and thaw of water standing in such a gutter as I have described. Could the lead be placed on over the tin without tearing out the tin? Any information on this matter will be very much appreciated by one who has been a reader of *Carpentry and Building* for many years, and derives much information from its columns.

Arrangement of Machines in Small Wood-working Shop.

From J. L. B., Queen Charlotte, B. C.—I have read with much interest the article in the February issue of the paper relating to "Machinery in a Small Woodworking Shop," and I would like very much to have some of the practical readers furnish for publication a floor plan showing the arrangement of the machines, the space required for convenient working, &c.

Finding Cuts for Hip or Valley Rafters in Roofs of Unequal Pitch.

From R. W. M., Uniontown, Pa.—During the past year considerable discussion ran through the Correspondence columns as to the proper methods of finding the cut against the ridge for a hip or valley rafter when the intersecting roofs are of unequal pitch. So many methods

takes to write about it, and is very simple. The reason for it will be seen if the square is imagined to be 24 ft. long instead of 24 in., and is laid on the roof with the edge of the blade coinciding with the edge of the hip and the tongue on the line B H of Fig. 1, as a line then drawn from the 21 ft. 6½ in. mark to the point H will exactly coincide with the line of the ridge.

Trouble With a Standing Seam Tin Roof.

From J. M. H., Taunton, Mass.—Will some of the practical readers of the paper tell me how to prevent a standing seam tin roof from sweating and injuring the ceilings of the rooms directly below. The roof has a pitch of 30 degrees and the tin is laid on hemlock boards, not matched, and no lining was used under the tin.

Would a good sheathing paper nailed to the inside of the rafters, thus making an air space of 6 in., be effective, or would it do just as well if it were applied directly to the under side of the roof boarding and turned

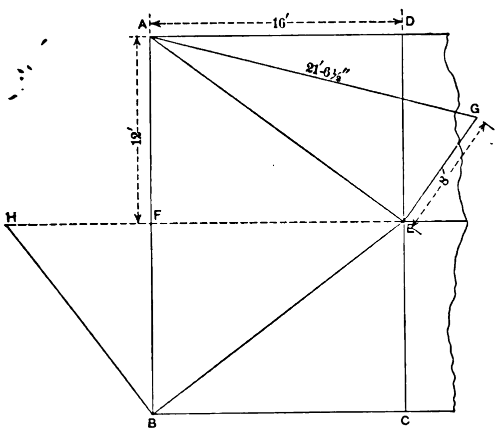


Fig. 1.—Plan of Hip Roof.

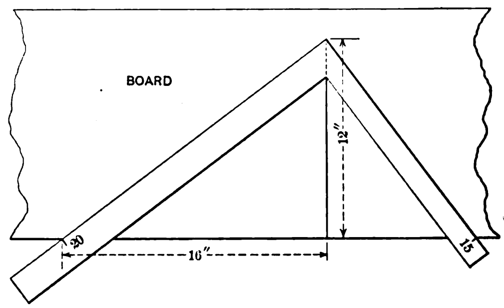


Fig. 2.—Using the Steel Square in Solving the Problem.

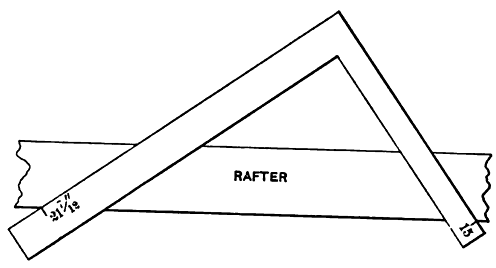


Fig. 3.—Finding the Cut with the Steel Square.

Finding Cuts for Hip or Valley Rafters in Roofs of Unequal Pitch.

given were either so complicated or else as in a few cases incorrect, that I venture to send a simple plan which will be found correct in all respects. The diagram, Fig. 1, represents the plan of a hip roof, the common side rafter C E having a run of 12 ft. and the common end rafter F E a run of 16 ft. The run of the hip A E will thus be 20 ft. The rise of the roof is 8 ft., so the length of the hip is 21 ft. 6½ in. Referring to the diagram, make B H square with B E, the run of the hip, and extend the ridge line to intersect B H at H. Take B H on the tongue of the steel square and the length of the hip on the blade, and the blade will give the correct cut before the hip is backed.

This can be done with the square alone without the use of a diagram by squaring up on a board the run of the side rafter—in this case 12 ft.—using inches as feet and measuring the run of the end rafter along the edge of the board from the foot of this line, as shown in Fig. 2. Lay the heel of the square on the 12-in. mark on the perpendicular with the blade touching the 16-in. mark on the edge of the board, the blade thus giving the run of the hip. The tongue will then give the proper figures to use in finding the cut—in this case 15 in.—and by taking this on the tongue and the length of the hip, 21 7-12 nearly, on the blade, the blade will give the cut as shown in Fig. 3. This can be done in much less time than it

down the sides of the rafters and a strip nailed over it.

The trouble seems to come from the snow lying on the tin condensing the moisture in the hot air, as the building, a dwelling house, is well heated by means of a hot water system. The attic is unfinished. I should esteem it a great favor if some of those who have had experience would please give me the benefit of their knowledge regarding this matter, and it may also be of interest to others besides myself.

I take this opportunity of expressing my appreciation of the practical help *Carpentry and Building* has been to me for the past 26 years, during which time I have been a close reader of its columns.

A Pioneer Reader of Carpentry and Building.

From D. A. Betts, Franklin, N. Y.—Replying to the inquiry of H. H. Wheeler, Plymouth, Conn., I would say that I can supply him with any number or numbers he may wish, as I have every issue of *Carpentry and Building* from the first year of its publication to the present time. All are in first-class condition and bound, two volumes in one, except some six or eight years past.

Carpentry and Building is a welcome visitor to me and has been appreciated very much for the information received. Nearly 50 years have gone by since I was an apprentice, and in those early days all moldings were "stuck" and all planing was done by hand. We commenced work in the morning as soon as there was light enough to see and we worked until dark, but the old order of things has passed away and better days have come.

Stress Diagram for Plank Frame Barn Truss.

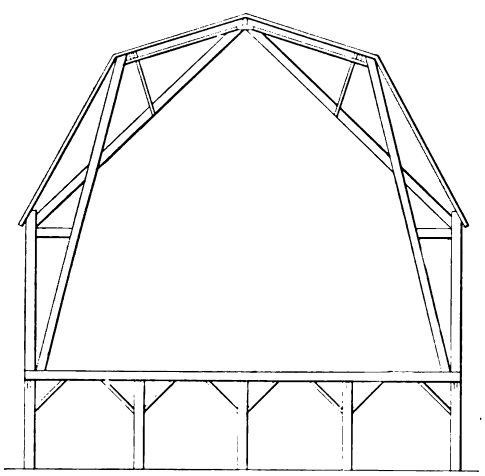
From D. C., Kalamazoo, Mich.—Will you be so kind as to publish the stress diagrams for a truss of the type which is used in plank frame barns which have been described in one or two articles appearing in *Carpentry and Building* in the recent past? I am inclined to the opinion that an article on this form of truss would be interesting to many readers and I personally will consider myself favored if you do this. The type of truss which I have in mind is indicated in the accompanying drawing.

Answer.—In Fig. 1 of the accompanying illustrations is presented an interior bent for a plank frame barn, and concerning which the correspondent above desires the stress diagrams. This interior barn bent is built up as follows:

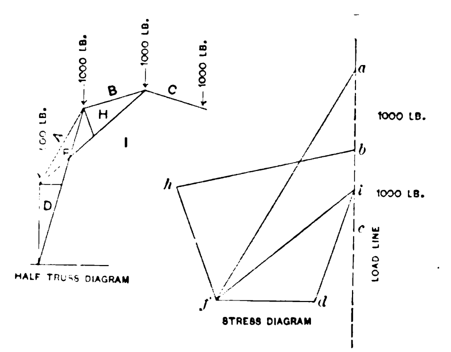
The posts in the basement consist of five 2 x 8 in. planks, two of which are 8 ft. long and three of which are 7 ft. 2 in.; the sills or joist bearers are built of three planks 2 x 10 in., extending lengthwise with the barn; the braces are built of 2 x 4 in. stock. The cross sill is formed of two 2 x 8 in. plank, with a 6-in. space between. The main posts are built of two 2 x 8 in. plank spaced 2 in. apart. The long strut I D is made of two 2 x 8 in. plank separated by a space. The top member of the frame, in two sections, A F and B H, are built of a 2 x 8 in. plank. The collar beam is simply a ridge stiffener built of two 2 x 12 in. plank spaced 2 in. apart. The member I F, referring to its full length, is built of a 2 x 6 in. joist. The strut F H is built of two pieces, 2 x 4 in. The main plate, not indicated on sketch, is built into the form of a rectangular trough and inverted over the top of the post. The topmost intersections are bolted. The upper ends of the pieces I D are cut down 4 in. on a line parallel with the roof supports, and again at right angles with the first cut, forming a saddle, in which are placed the purlin plates.

The frame above described is in reality not a truss, but a braced arch. The post A D receives only a part of the reaction of the total load, as the other part is carried down to the basement post by the stress delivered through the inclined member I D.

It is difficult to letter this construction so as to avoid confusion of parts and conflict of nomenclature in accordance with previous studies of this character published heretofore in this journal. The difficulty occurs in identifying the member I F and apparently I H, but the two are really one member, and form the upper part of the interior section of the bent. F H is simply a stay or strut producing a transverse stress on the piece I F, a stress which may readily be calculated as an undistributed central load. One-half of the truss is shown in a diagram, the stress diagram is given in which the stress *a f* represents the stress in A F, *b h* in B H, &c. Nominal loads of 1000 lb. each are given as apex loads in order to form a tangible basis for working out the stress diagram, as no stated loads are given in "D. C.'s" inquiry. The section A F should be built of two 2 x 8 in. joists instead of one piece. C. P. K.



Inside Bent of Plank Frame Barn, Showing Construction for Which Truss Diagram Is Wanted.



Stress Diagram and One-half of Truss Diagram.

Stress Diagram for Plank Frame Barn.

Suggestions Wanted for Laying Linoleum.

From Africander Reader, Johannesburg, South Africa.—Will some kind reader with experience of linoleum laying on concrete floors please supply me with a recipe for making paste or a solution for the above purpose. I have at times a large area to cover and paste with flour as a basis has been used in the past. Owing, however, to the linoleum having to be washed daily by natives, who have no regard for a too liberal supply of water, the latter percolates through the joints, renders the linoleum loose at the edges, which soon curl up and is broken away long before it has had reasonable wear.

It will be of very little advantage advising me to use a proprietary article, for the chances are I would not be able to purchase it in Africa.

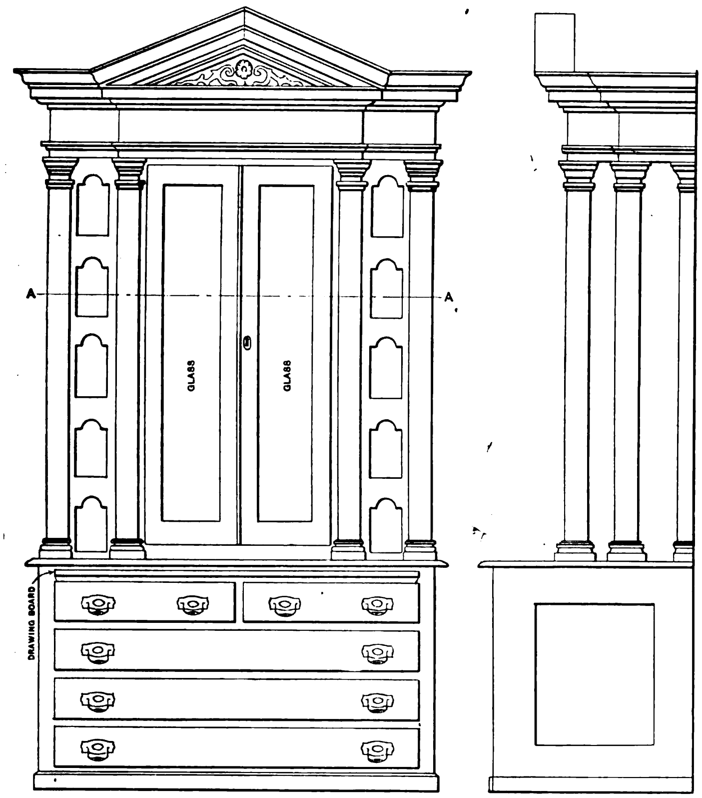
Inexpensive Wall Construction.

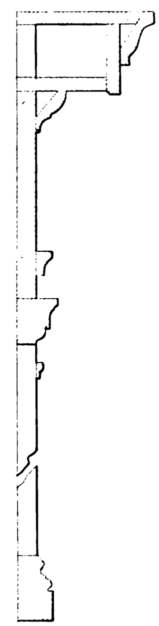
From W. D. Graves, Florence, Mont.—While lath and plaster make, on the whole, the most satisfactory wall for the cost, there are besides the usual attempts at something cheaper many substitutes costing as much or more. The extreme dampness necessarily connected with plaster makes it objectionable, even on new work; and, in case of alterations and repairs, the moisture and slop are often prohibitive. There are now on the market several wall boards which are excellent substitutes, and which compete with plaster in price; but such are not always available for small jobs.

A substitute which the writer has seen used to some extent, for years past, has proven quite satisfactory in the cases noted. This is made by boarding over the studding with a cheap grade of lumber, resawed, and covering this with carpet felt. The felt is secured with paste, and covered with the usual wall paper. This wall has proven durable and warm, though open to the objection of inflammability. It has developed no cracks during five or six years of service, and seems good for many more years. In case of failure, it would be very easy of repair. The lumber used, in most instances, was 6 in. fencing of low grade.

Design for a General Contractor's Cabinet.

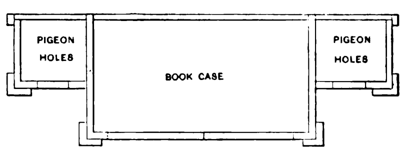
From C. J. M., St. Johns, Newfoundland.—In answer to "H. R. S.," New Ulm, Minn., I send herewith a design for a cabinet which I hope will answer his purpose. As will be seen from the drawings, the lower part is in the form of a chest of drawers, these being large so that good sized drawings and blue prints may be laid out flat. Just below the counter shelf is a drawing board which slides in and out like a drawer. This board is made as shown in the sketch, the opening being made sufficiently large to slide the board in and out with the drawing attached. The upper part consists of a bookcase and pigeon holes as shown, the whole being surmounted with a neat pediment and cornice. There is such a cabinet in the office where I work, which is considered a very handsome and convenient piece of furniture. The only objection to my mind is that the pigeon holes are uncovered. Now, if they opened in the ends instead of in the front, and the end pilasters were left off so as to leave room for a door to shut over the pigeon holes, I think it would be an improvement.



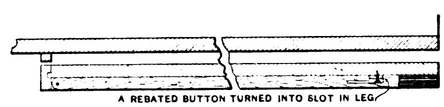


Detail of Cornice and Pilasters.—Scale, 1½ In. to the Foot.

Front and End Elevations, Showing General Appearance of the Finished Cabinet.—Scale, ½ In. to the Foot.



Plan of Bookcase.—Scale, ½ In. to the Foot.



Section of Drawing Board, Showing Folding Legs Fastened to Sides of Board by a Loose Pin.—Scale, 1 In. to the Foot.

Design for a General Contractor's Cabinet.

The cabinet I mention is made of cypress of good grain, polished in its natural color. The drawings are all numbered and catalogued and laid in the drawers with the numbers in the left hand outside corner, so that when any particular one is wanted all that is necessary is to refer to the catalogue, find the number of the drawing wanted, then fold back the drawings until the number is found, when it may be easily pulled out from between the others. A paper weight may be placed upon the corners that are folded back so that the place may be easily found when the drawing is replaced.

Cellar Damp and Smells Musty.

From J. W., Almonte, Ontario, Canada.—In the January issue "W. L. C.," Stephentown, N. Y., asks for help in curing a damp and musty cellar. My suggestion would be to place wire screens on the outside of the cellar windows, hang an outside or double door if necessary. and then open the windows at night for purposes of ventilation and shut them in the morning. If the nights are very warm do not open the windows, as hot air contains more vapor than cold air, and the hot air vapor comes in and condenses on the cool walls, leaving them damp.

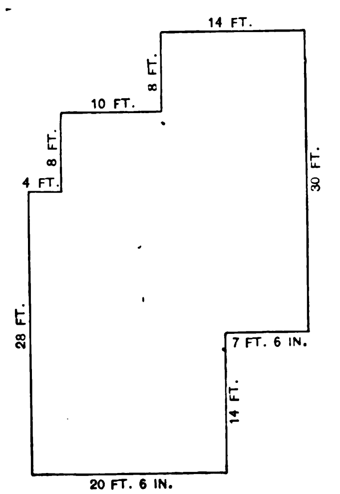
In the February issue "A. & S." say "clean and whitewash the cellar." I say the same, for "cleanliness is next to godliness." Mold is a fungus that thrives and grows in a dark and damp place. If the correspondent will do as above suggested he will soon have a dry and sweet cellar.

These rules or suggestions also apply to a milk room or to any underground room.

Drying Blue Prints to Prevent Wrinkling.

From R. P., Freeport, N. Y.—Referring to the inquiry of "D. M. R.," Michigan, in the April issue of the paper relative to the drying of blue prints to keep them from creasing or wrinkling, I would say that I have obtained very good results by merely pinning the two corners of a sheet to the edge of a shelf so it will hang clear. The weight of the sheet when thus suspended serves to keep it smooth and free from wrinkles.

From G. J. S., Grinnell, Iowa.—In answer to "D. M. R.," Michigan, as to a method for drying blue prints so that they will neither crease nor wrinkle, I would hang up the paper and let the water drain off. When almost dry, but still a little damp, roll up and keep rolled until perfectly dry. Paper so treated will not be wrinkly. Drawings which have been colored if rolled will also remain smooth.



Roof Plan Wanted for Dwelling.—Diagram Contributed by "G. W. G.," Storm Lake, Iowa.

Roof Plan Wanted for Dwelling.

From G. W. G., Storm Lake, Iowa.—I have been a reader of *Carpentry and Building* for several years and come to the practical readers who are architecturally inclined for a roof plan of an old house, a diagram of which I send herewith. The diagram represents the plate line, which is the same hight throughout; also the dimensions of the various parts.

Another Perplexed Stairbuilder.

From A. M. B., New Rochelle, N. Y.—I am very much interested in the articles on stairbuilding by Morris Williams, and especially that part which treats of the laying out of continuous hand rails. As Mr. Williams invites questions on the subject from interested readers, I would like to ask concerning one or two points, so that they may be cleared up to my satisfaction. At present they greatly perplex me. I would here state that I have been greatly enlightened by the explanations given in answer to the question of "G. H. G.," in the February issue of this excellent paper.

In diagram 25, page 394, December issue, what is meant by the "level plan tangent," or, in other words, why is the elevation of tangent H *d* at the pitch of the straight flight and the elevation of the tangent S *d* level? Again, how does one determine which bevel applies to the shank end to join the straight rail and which applies to the other end when there are two bevels, as in this case?

I may say that I have been viewing the proposition thus: Let S *d h* represent a prism having its hight equal to the sum of four risers, being cut by an inclined plane from *h* to S, and passing through a point *d* in the elevation, and taking the elevation of the point *h* as the extreme hight. By the prism theory I can follow Mr. Williams in laying out the rail over the 10-in. cylinder at the landing, but in the other case I have failed. If Mr. Williams will throw light upon these points I am sure he will benefit other perplexed brothers as well as myself.

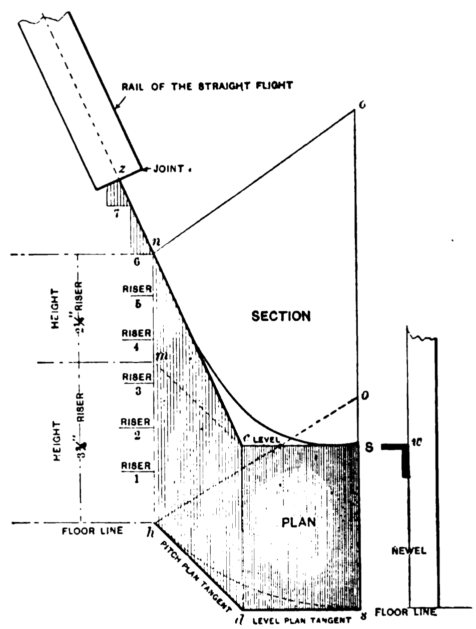
Answer.—In explaining away the perplexities of the above correspondent Morris Williams furnishes the following: To enable "A. M. B." to understand "why" the elevation of the tangent H *d* in diagram 25 on page 394 of the December issue is made to incline equal to the pitch of the straight flight, and "why" the elevation of the tangent S *d* is made level, I herewith present a diagram showing plan and elevation of Fig. 25, containing the tangents and center line of the wreath. In the accompanying diagram is shown from *n* to *c* the elevation of the plan tangent *h d*, standing over and above it. At *c* S is shown the elevation of the plan tangent *d s*, standing over and above its plan. The elevation *n c* of the plan tangent *h d* is shown to be an inclined line, aligning with the center line of the flight rail, to which the wreath is to be jointed, as shown at *z*. This is "why" the tangent *n c* is required to have the same pitch as that of the straight rail.

The joint of the wreath at the shank end *z* is made square to the tangent *n c*, and because the tangent aligns with the straight rail the joint will be a true "square butt joint," whereas if the pitch of the tangent and the pitch of the flight rail were to deviate a true butt joint could not be obtained.

The same remarks will apply to the level plan bottom tangent *d s* and its elevation tangent *c* S, shown over and above it.

The wreath at the end S, by having the tangent level and making the joint square to it, will butt square against the newel, as shown at *w*. By this arrangement of the tangents the wreath will contain what is known as an "easement" at the end S, connecting to the newel, which is the most common method of treatment for a wreath, over and above a stretchout curve at the bottom of a flight.

The way "A. M. B." views "the proposition" is correct, except in respect to the hight of the prism. It is not equal to the "hight of the sum of four risers," but, as shown in both Fig. 25 of the December issue and the accompanying diagram, it is equal to the sum of two and one-quarter risers, as shown from *m* to *n* in both figures.



Another Perplexed Stair Builder.—Diagram Accompanying Reply to "A. M. B."

Concerning that portion of the correspondent's inquiry in which he asks as to "which bevel is to be applied to each end of the wreath," I would say that the rule is to apply the bevel to the tangent from which its altitude is measured. For example, the altitude of bevel *b* in the diagram D in the December issue is made equal to *a b* of Fig. 25, which is a perpendicular line to the pitch tangent *c n* drawn from the point *a*. The bevel *b*, therefore, is to be applied to the pitch tangent *c n* at the end *n* of the wreath, or, rather, at the shank joint *z*, as shown in the sketch accompanying these comments.

The distance *m n* in both Fig 25 and the accompanying diagram will be the altitude of the bevel that is to be applied to the end S of the wreath, and it represents, as shown, the distance from the point *n* to the level tangent continued to *m*.

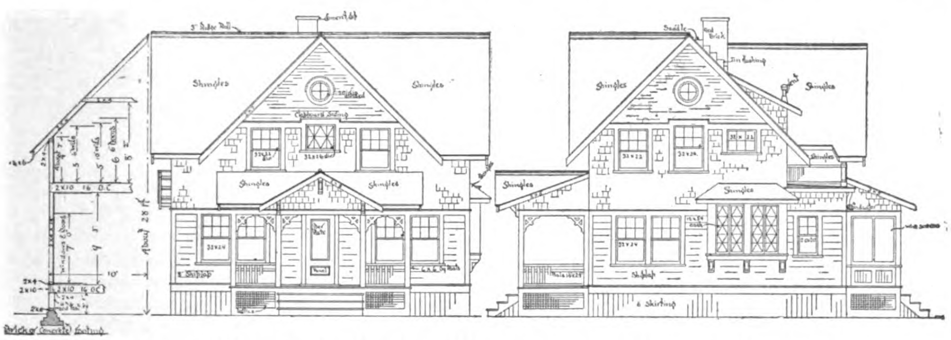
Developing the Plans for a Workingman's Home.

From Matt Riley, Sturgeon Bay, Wis.—I am sending under separate cover drawings showing foundation, floor and roof plans, also elevations and a few constructive details of a workingman's home in reply to the inquiry of "A. T.," Pasadena, Cal., in the February issue. In making these drawings I have tried to follow out his ideas of a home as near as possible and hope the arrangement and exterior treatment may meet his favor. I do not claim to be an architect, nor yet a draftsman, so if the work appears as if it were done by a shoemaker, I must say that I am only a "poor old dead timber driver" who has been putting up buttery shelves around through the country and just fixed up these plans for a pastime so as to keep out of mischief, as the weather has been too cold to go fishing and there was nothing doing here in the carpenter line; that is, for the home guard.

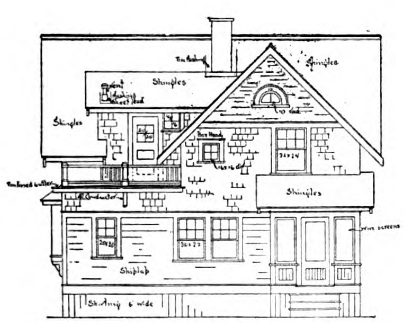
There is a high school being erected, but the job has been let to an outside firm, and they have brought in their own workmen, while, to clap the climax, they board with a man who puts 50 cents out of circulation every time he gets a dollar. Still the local papers are filled with home trade news and "knocking" the mail order houses, but it would be just as well to give the latter or any other firm their buildings to put up and have them shipped in "knocked-down" shape for all the benefit it is to the city. It is like the old saying "the nearer the church the further from God."

Well, that is not what I started in to write about, but to just explain a few points of "A. T.'s" plan. I have included a sub-floor, but, of course, that can be left out, in which case the girder running lengthwise through the building should be lowered so that the joist will run across the top and be lapped and spiked together, making a tie.

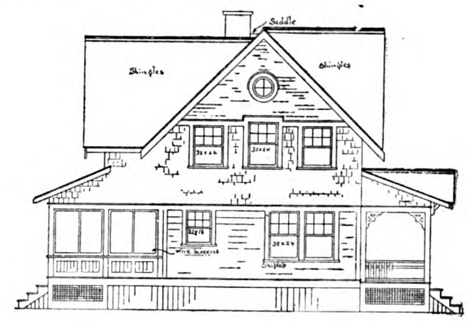
There are two methods showing shiplap as siding. If the first method is used it will cheapen as well as simplify matters, as the corner boards and window frames could be put in place after the siding is finished, while with the second method it would require thicker material for corner boards and casings, and it would take more time to do the work, although it would put up a better appearance. I would advise the use of 10d. box nails for the edges and 10d. common nails for the centers of each board. If good material is used and the parts of each board that come in contact with each other be cased, the center part of each piece may be drawn close up to the studding, thus forming a slight curve.



Section, with Front and Side (Right) Elevations, as Reproduced from Author's Drawings.



Rear Elevation.



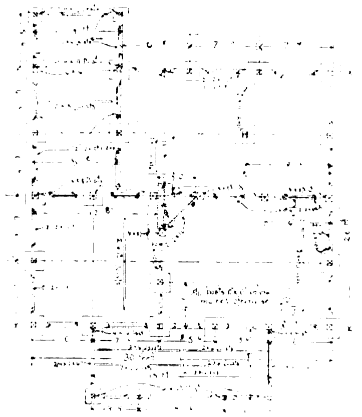
Side (Left) Elevation.

*Developing the Plans for a Workingman's Home.—Elevations.—Scale, 1-16 In. to the Foot.—Contributed by **Matt Riley**, Sturgeon Bay, Wis.*

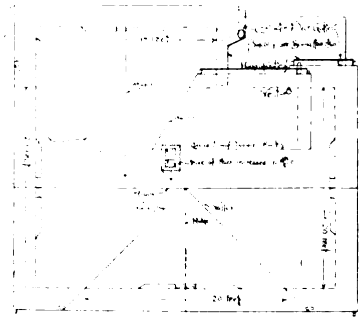
I would advise the use of the dovetailed wood lath on the outside walls on account of so many window openings, as they will stiffen the building.

The walls should be close boarded where shingled. The clapboard siding should be sufficient above the windows in the gables and 2 x 6's should be used for wall rafters. A frieze of 1 x 4 in. stuff should come flush with the bottom of the 4 x 4 lookouts, that should run back to the second rafter from the ends. Pieces may be cut and fitted between the studding around gable window openings, to which to nail window casings and clapboards. The 2 in. of rafter below the frieze will be used for nailing purposes. The eave rafters can project full size; that is, 2 x 4, and covered with matched V-joint stuff that should miter over the valley rafters in the valleys and pieces put in diagonally at the exterior corners, as it is intended to run the rake cornice covering with the pitch of the roof.

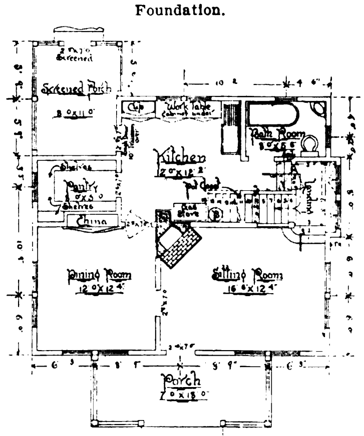
through on the underside. The V-joint stuff should project ⅞ in. outside the barge boards and shingles ¾ in. outside of the V-joint. On the eave parts the shingle butts may run 1½ in. outside of the V-joints. Shingling strips can be used on all other parts of the roof.



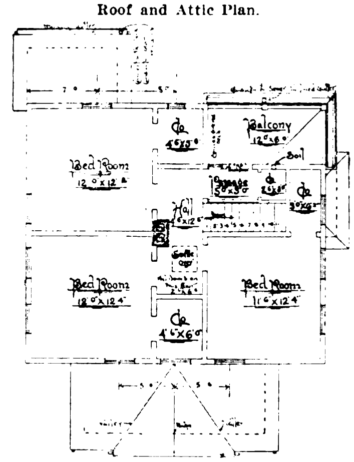
Foundation.



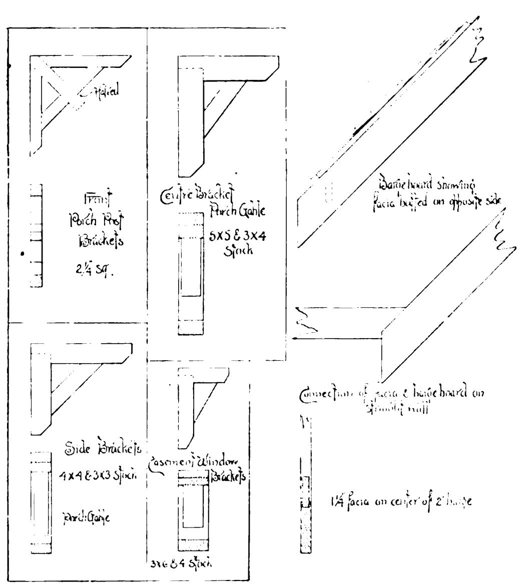
Roof and Attic Plan.



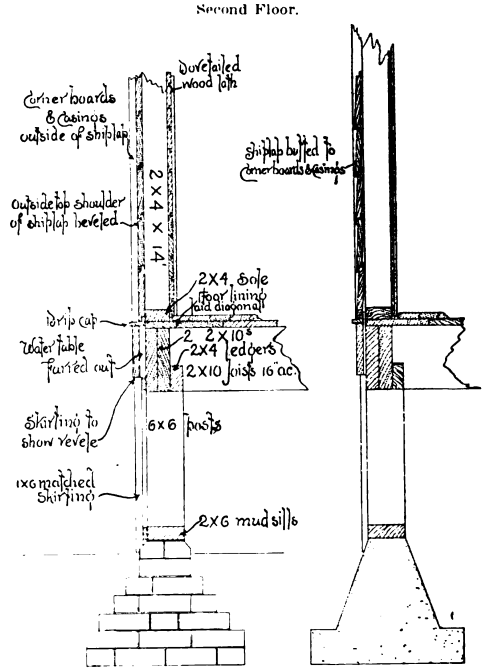
First Floor.



Second Floor.



Interior and Exterior Details.—Scale, ⅜ In. to the Foot.



Sections Showing Different Footings: Also Siding and Lathing. —Scale, ½ In. to the Foot.

Developing the Plans for a Workingman's Home.—Scale of Floor Plans 1-16 In. to the Foot.

Care should be taken when nailing the first course of shingles to drive the nails slanting, so as not to show

Gable sash may be hung on pintles and operated with sash lifts from the second floor. The rear gable sash are to be hinged on the bottom rail and operated in the same way.

Box-head frames should be provided for the three clothes closet windows, and sheet prism glass used for the lower halves of the bathroom windows.

Two rows of cross bridging should be used in all 12 ft. spans of joist and one row in other spans.

If the kitchen chimney flue is not used as a smoke flue it may be utilized for ventilating purposes.

Where 4 in. partition walls are shown on the plans the studding is to be used flatwise.

No stoop has been shown at the back porch on account of not knowing which way the steps should lead.

The casement windows and front clothes closet sash are to be Queen Anne style, glazed with single strength glass.

It has been figured to have the door frame leading to deck set up about 3 in. above deck. Covering and walls should be well flashed for about 4 in. The glass area in the door from deck may be increased if desired.

As will be noticed, a newel and rail are shown at the rear sides of the stairway, also a newel and short rail at landing.

All upstair windows may be raised 6 in. higher from the floor than shown on the elevations if so desired.

The deck is to have ¾ in. fall to the foot run.

Note.—Some of our readers have in the recent past intimated that they would like to see published the design of a house with the illustrations reproduced direct from the author's drawings, in order that everything appearing on plans as prepared by architects might be readily apparent. Thinking that the floor plans, elevations and details accompanying the communication of our correspondent above were of such a nature as to meet the expressed wishes of our readers in this respect, we have made direct reproductions of them, showing the excellent manner in which this correspondent has done his work, and at the same time indicating the care which he expended in preparing the drawings for the sake of assisting a fellow craftsman. The appearance of his work is certainly a credit to his efforts, and is a striking contradiction to the statement contained in the third sentence of his opening remarks.

In this connection we would be glad to have an expression of opinion from our practical readers as to whether they prefer illustrations of houses made direct from architects' drawings, as here shown, or by the "line process," which is ordinarily employed in the production of our engravings. A good example of the latter is found in the illustrations of the first prize design in the Bungalow Competition.

WHAT BUILDERS ARE DOING.

As the building season develops the volume of new projects continues to expand, and there is every indication of a most active period in the building line, far surpassing the conditions existing a year ago. The increased activity is especially noticeable in some of the larger cities, although it must be remembered that a year ago the country was still suffering from the effects of the financial stringency of 1907 and business was therefore at a low ebb. The notable increase in the Boroughs of Manhattan and the Bronx, in New York City, is due in large measure to the rush to file plans for apartment houses in anticipation of the adoption of a revised building code, so that in a measure the activity is more apparent than real. Of the cities concerning which figures are available for the month of March, several of the smaller ones show decreases, but these are comparatively insignificant when contrasted with the enormous gains in the others. Taking the country broadly the estimated cost of building improvements for which permits were issued last month, was just about double what it was for the month of March last year, and all indications point to a fairly active season. Thus far comparatively little labor friction has developed in any branch of the building industry and the situation considered as a whole contains much that is encouraging.

Chicago, Ill.

The building prospects for Chicago as reflected by the building permits issued during the first quarter of the present year point to an active season in new construction. As compared with the same period last year, the first three months of 1909 show a gain in cost of permits taken out of nearly 50 per cent. The figures for the two periods are as follows: 1908, first quarter, number of buildings 2100, feet frontage 54,250, total cost $11,033,950; in 1909, first quarter, number of buildings 2751, feet frontage 74,577, total cost $21,532,-500, the increase for this year being 651 buildings, 20,327 ft. frontage and $10,498,550 in cost.

The ratio of increase for each month of the present year over the corresponding one of last year has been very satisfactory, the gain for March over the same month a year ago netting an increase of 150 buildings with 5796 ft. of frontage and a cost of $3,316,500. In March, 1909, there were permits taken out for 1254 buildings having a frontage of 32,831 ft. and a total cost of $8,145,800, as against 1104 buildings with 27,062 ft. frontage and an estimated cost of $4,829,300 for the same month in 1908.

These figures would seem to indicate that realty investments are attracting a good deal of capital that in ordinary times finds investment in other forms of securities. Some trouble has arisen in wage adjustments with some branches of organized labor, and at present the tile layers, electricians and glaziers are on a strike. The steam fitters have practically reached an agreement with the fitting contractors, and are now negotiating for an adjustment of the helpers' wages. In practically all other branches of the trade agreements for the ensuing year have been either signed up or are under consideration, with a prospect of an early settlement.

Cincinnati, Ohio.

As compared with a year ago the building season is decidedly active and architects and builders are doing a considerable volume of work. Many new dwellings are being erected in the suburban sections, of which the city can boast many of a most attractive nature, and here and there in the business centers improvements are going on which involve in the aggregate a considerable outlay. According to the figures of the Building Department permits were taken out in March for 474 buildings, aggregating an estimated outlay of $914,-675. In March, last year, the department issued 391 permits for building improvements having a valuation of $428,-340.

At present there are no signs of any serious labor disturbances, although this matter does not usually come to a head until about May 1, and everything now points to a gratifying period of building activity in which labor in all branches of the industry will be more or less employed.

Cleveland, Ohio

Building operations in this city continue to show a marked improvement as compared with a year ago and the outlok for a very active year is highly gratifying. During the first three months of the year permits were issued for buildings to cost $2,169,318, as compared with permits for buildings to cost $1,276,780 issued during the corresponding period of 1908. During March, 741 permits were issued for buildings to cost $1,165,983. During the same month last year 738 permits were issued for buildings to cost $745,985.

Several fairly large mercantile buildings have been projected and will be erected in the down town business district during the season, work on some of them having already started. Engineering concerns have considerable work on hand in the way of preparing plans for additions to industrial plants. Activity in the erection of buildings in which steel is used is being stimulated by the present low price of material.

Denver, Colo.

More than one-half of the total estimated cost of building improvements for which permits were issued in the city of Denver during the month of March was for brick and frame dwelling houses, for which there seems to be an ever increasing demand. Of course, the great majority of the new dwellings are of brick construction, as out of a total of 203 permits for residences, 195 were for brick, to cost $524,-500. The remaining eight permits were for frame dwellings, estimated to cost $5000. Analyzing further the monthly report of Building Inspector R. Willison, there were permits issued for eight apartment houses, to cost $149,000 and seven terraces to cost $40,000. Other improvements projected included three hotels to cost $153,000, and 11 business buildings to cost $41,000, while two warehouses were to cost $37,-000.

The total number of permits issued for March was 335, calling for an estimated outlay of $1,046,750, while in March last year 312 permits were issued for improvements, to cost $901,850.

For the first quarter of the current year 842 permits were issued by the Building Department for improvements, costing $2,555,173. These figures contrasting with 582 permits for building improvements, costing $1,755,250 in the first three months of last year.

Detroit, Mich.

A perceptible increase in activity is to be noted in building circles, and there is every indication that as the season develops the volume of operations will be very close to normal. March is usually a month of increasing building, and this year is no exception, as may be seen from the statistics issued by the Building Department. Last month permits were taken out for 374 buildings, estimated to cost $934,000, while in March last year 321 permits were issued for improvements, costing $667,450.

The members of the Builders' and Traders' Exchange held their banquet at the Hotel St. Claire on the evening of April 5, and it was a most enjoyable affair. The *menu* was printed on building paper, and various terms common in the building trades were used in connection with the different dishes. A quartette furnished music during the evening, and John L. Austin, ex-president of the exchange, was toastmaster. In the course of the evening he was presented with a large leather armchair, the presentation being made by John Putnam. Other speakers were: Charles Schermerhorn, F. D. Stevens, C. H. Bryan, Dr. E. B. Smith and Prof. A. H. Griffith, the latter showing a series of stereopticon views of some of the important works of architecture in the Old World.

Grand Rapids, Mich.

Quite a perceptible increase is to be noted in building operations the present season as compared with a year ago, although the total amount of capital involved in current operations would not be considered large in some cities. Last month the Building Department issued 148 permits for new improvements calling for an outlay of $201,000, while in March last year only 84 permits were taken out for buildings estimated to cost $90,795.

At the annual meeting of the Building Contractors' Association of Grand Rapids, held in the Board of Trade rooms the middle of March, the following officers were elected for the ensuing year:

President............Edwin Owen.
Vice-President........John H. Hosken.
Treasurer............Paul H. Richens.
Secretary............Harry E. Hosken.

The directors chosen for the year are Fred Vanderveer, chairman; C. J. Brill, Emil Gentz and George Vander Meer.

Los Angeles, Cal.

As was expected, the improved weather conditions of the last few weeks brought about a rapid revival in building. The improvements for the month of March reached a total of 719, with a valuation of $1,119,000, or slightly more than double those of the month preceding—$584,000. The revival is almost wholly in the line of frame buildings, and in these the chief element is new residences of the smaller sort, ranging in cost from $1000 to $1500. Builders are generally inclined to hold that the spring and summer will show no marked change. The plans now in the hands of the architects justify the expectation of a season of average activity in frame construction, with very little in the way of notably large buildings. There is also a prospect of considerable work in the outlying cities and suburban towns, this, too, being largely in frame and the smaller sort of brick buildings.

The situation in the materials market is encouraging to builders, and may lead to more construction than now appears likely. Brick are in plentiful supply and are low in cost, ranging about $6 per thousand. Lumber is plentiful and with the northern mills not overcrowded with orders, it is expected that shipments to this city and other points in Southern California will be heavy for some time to come.

Minneapolis, Minn.

An increase of 90 per cent. is shown in the estimated cost of the building operations projected last month as compared with the work started in March of last year. The 403 building permits issued from the Building Inspector's office fall considerably short of the 435 issued in March 1908, but the estimated cost of the buildings authorized last month aggregated $752,320, while the figures for March of last year were $413,200. With the exception of March, 1905, last month was the banner March as regards building totals in the history of the city.

The figures for the first quarter of the present year show that 799 permits were issued, as against 893 for the corresponding period of last year. The estimated cost of building authorized the first quarter of the year totals $1,430,905, as against $994,525 for the first quarter of 1908.

The Architectural Club of Minneapolis will give an exhibition April 17 to May 3, inclusive. The exhibition will be in the nature of an exposition, with numerous discussions and addresses and a general display of architectural designs and data.

A party of local builders upon special invitation attended the sixth annual banquet of the Duluth Builders' Exchange March 27. The party included George M. Gillette, Eugene Young, Herbert A. Rogers, Walter Thorpe, C. J. Anderson, Samuel Berkmayer, George M. Russell, H. W. Rogers, E. F. Hussey and John B. Harker.

The rumors of impending labor troubles seem to be farther from realization than ever. Although May 1 is regarded as the real date of the opening of the building season, an unusual amount of building has been in progress all through the winter, with the result that the opening of the building season will be less of an event this year than is ordinarily the case. All branches of labor seem content with the present scale of wages, and the employers are not inclined to take up the fight on the open shop. The indications on all sides are for a prosperous season in the building line, and both capital or labor are loath to spoil the chances of a good season by precipitating a labor war.

New Haven, Conn.

Some idea of the extent of building operations throughout central Connecticut may be gathered from the statistics available for the month of March just issued by the Building Departments of the four leading cities. In New Haven 108 permits were issued for improvements, valued at $364,805 as compared with 78 permits last year for new buildings, involving an outlay of $225,018. In Hartford 82 permits were taken out in March for new work, having an estimated valuation of $244,155, and in March last year 59 permits were taken out for new buildings, costing $117,760. In Bridgeport 57 permits were issued last month for buildings, estimated to cost $148,945, and in March last year 50 permits were issued for work, costing only $69,047. Waterbury makes a little better showing, with 65 permits issued last month for improvents, costing $298,300, as compared with 41 permits for improvements, costing $77,700, in March a year ago. The total for the four cities for the month of March is $1,056,205, as compared with $489,525 in March last year; $1,014,570 in March, 1907.

New Orleans, La.

A large amount of work is in progress in various sections of the city, which is very gratifying to builders and contractors generally. The number of individual operations is well ahead of a year ago, but the estimated value of the current operations is not much more than one-third of the valuation for the first quarter last year. There were issued at the City Hall in the first three months of this year 677 permits for new buildings, alterations and repairs, while in the corresponding period of 1908 there were 448 permits issued. The estimated value of the improvements for the current quarter aggregated $726,909, while in the first quarter of last year the estimated valuation was $2,193,761. The aggregate in the latter case was swelled by a permit in March for a large commercial building.

The value of the building operations for which permits were issued last month was $341,599, while in March last year the estimated valuation was $1,833,771. The activity has been confined largely to the residential section of the city, where many attractive dwellings ranging in cost from $5000 to $10,000 each have been completed and others are under way. In the matter of commercial development building operations are quite active, particular interest at this time centering in the Whitney-Central Bank Building, the proposed Metropolitan Bank and Office Building and the new structure for H. T. Cotton & Co.

New York City.

The particularly noticeable feature of the local building situation has been the continuance of the activity noted last month in filing plans for apartment houses in order to anticipate the adoption of a revised building code, now under consideration. In the Boroughs of Manhattan and the Bronx permits were taken out for 425 buildings, estimated to cost $22,526,150, as against 178 buildings, estimated to cost $2,700,000, in March last year. In Brooklyn the increase in the amount of new work projected is not quite so marked as in the Borough of Manhattan, but the figures make a very gratifying showing nevertheless when compared with the situation a year ago. The value of the improvements for which permits were issued in March was $3,670,940, while in the same month last year the estimated cost was $2,082,190. In the Borough of Queens plans were filed for 488 buildings, estimated to cost $942,846, which is an increase of 70.5 per cent. in the number of structures planned and 8.5 per cent. in the estimated cost as compared with the figures for the corresponding month of last year.

For the first quarter of the year the number of permits issued in the Borough of Manhattan was 325, calling for an estimated outlay of $41,194,750, while in the first three months of last year 119 permits were issued for improvements estimated to cost $6,361,900. The estimated cost of alterations to buildings in the first quarter of this year was $2,753,000, and in the first three months of last year, $3,371,000. In the Borough of the Bronx permits were issued in the first three months of this year for 691 buildings estimated to cost $11,531,540, while in the corresponding quarter of last year permits were issued for 276 buildings estimated to cost $2,572,575.

Of the total value of the improvements for which permits were issued in the Borough of Manhattan in the first quarter of the current year, $25,000,000 was the estimated cost of 193 apartment houses for which permits were issued, and in the Borough of the Bronx permits were taken out for dwelling houses and brick tenements, or "flats," involving an estimated outlay of over $9,000,000.

In the Borough of Queens plans were filed during the first quarter of the current year for 1082 buildings costing $3,205,839, while in the first quarter of last year permits were taken out for 647 buildings estimated to cost $2,510,144.

At the annual meeting of the Mechanics' and Traders' Exchange, held in the rooms of the Building Trades' Employers' Association in the Builders' Exchange Building, 29 to 35 West Thirty-second street, the following officers were elected for the ensuing year:

President .... F. N. Howland.
Vice-President ....F. E. Conover.
Secretary ....Ronald Taylor.
Treasurer .... Charles A. Cowen.

TRUSTEES.

Augustus Meyers, Lewis Harding,
Edwin Outwater, J. J. Roberts,
C. A. Cowen, Francis M. Weeks,
Ronald Taylor.

The Master Carpenters' Association elected officers for the ensuing year as follows:

President ....J. H. MacDonald.
Vice-President ...... J. A. Sinclair.
Treasurer .... Alex. H. Hamilton.
Secretary ....Robert Christie, Jr.

The following trustees were chosen for three years: Robert Christie, Sr., John I. Downey and Edwin Outwater.

The Mechanics' and Traders' Exchange and the Building Trades Employers' Association have virtually consolidated, although the Mechanics' and Traders' Exchange will retain its charter, which bears date of May 2, 1863, and gives it two representatives on the Board of Examiners.

Oklahoma City, Okla.

There was a tremendous impetus given to building operations last month, and the city is showing a phenomenal growth so far as this particular branch of industry is concerned. According to the statistics available, the value of the building improvements projected in March was $1,385,625, as against $351,070 in February and $235,325 in January. These figures contrast with $134,100 in March last year; $38,500 in February and $27,600 in January.

For the first quarter of the current year the value of the projected building improvements was $1,927,020, and in the first quarter of last year $200,200.

Oakland, Cal.

There has not been any great activity in the building trades in this city, and the surrounding towns during the last few weeks, though the record for March shows up somewhat larger than that of February. During March the total value of the permits issued amounted to $395,650, as compared with $375,000 for February. The outlook for the next few months is for a considerable amount of new building in frame and the smaller sort of brick construction. Several large buildings are projected in the city proper, as well as in the adjacent city of Berkeley, but these have so far not advanced to a state where a date has been set for construction.

Omaha, Neb.

If the present rate of activity in the building line continues 1909 is likely to make a record so far as the value of the operations is concerned. Thus far the year shows the greatest total improvements of any corresponding period since the establishment of the Building Inspecting Department, the nearest approach to it being that of the best year which the city ever experienced when the total for the first three months was $683,165. The total for the first quarter of the present years shows a valuation of $1,129,535, as contrasted with $593,820 in the first three months of 1908. This is an increase of almost 100 per cent. for the quarter.

Last month made an exceedingly good showing, there having been 149 permits issued for building improvements, estimated to cost $611,245, while in March last year 120 permits were issued for new work alterations and additions valued at $221,620.

Philadelphia, Pa.

From statistics compiled by the Bureau of Building Inspection, it is to be noted that there has been a steady improvement in building conditions from month to month. The first quarter shows a substantial increase when compared with the same period last year, permits for 3630 operations having been issued during January, February and March, aggregating an estimated cost of $7,676,145, as compared with 2344 operations, costing $4,662,430, in the same period in 1908. The steady gain noted is taken by builders as being indicative of a return to normal conditions during the current year.

Operations during March were on a fairly normal scale, 912 permits for 1848 operations, at an estimated cost of $3,857,840, being issued. This exceeds the expenditure for February by $1,716,560 and that of March, 1908, by $1,367,900. In fact, the expenditure during the past month was only exceeded five times in the past 12 years. There was a substantial increase in two-story building operations during the month, 948 operations of that character being started at a cost of $1,896,450, an increase of 423 operations, with an increase of $835,620 in value. Three-story dwellings also showed a material increase over the previous month, there being 148 operations, at a cost of $698,525, an increased expenditure of $548,225 for that class of work. There was a decrease in the amount of work done in manufacturing buildings. A substantial increase, amounting to $246,000, was, however, to be noted in apartment, flat and tenement houses. Work on municipal buildings, covering an expenditure of over $100,000, was also reported.

Generally speaking, the outlook for building during the spring is exceptionally good. In addition to a large amount of contemplated work in dwelling houses, proposals for several schoolhouses are being asked for by the city. Bids for the new building for the Curtis Publishing Company, estimated to cost $1,000,000, are in the engineer's hands, and are expected to be let in the very near future. Some fairly good office building work is also under consideration. The low price of structural work is bringing out some latent business in the building line, and will, it is believed, result in some of the long deferred business being placed.

The Philadelphia Master Builders' Exchange is making a more determined effort to bring the advantages of that organization more fully to the attention of the building trades. On March 22 the exchange invited the members of the various trades to join with the members in a smoker and vaudeville entertainment, which was largely attended. The various officers of the exchange made brief addresses, as did also T. F. Armstrong, who had charge of the arrangements. At a subsequent meeting several changes in the by-laws were made, an amendment making dues payable semiannually was passed, as was also one providing in a formal way for applications for membership, one feature of which was that one-half year's dues must accompany the application blank. The work of the exchange is progressing very favorably, and it is believed that the membership will be largely increased.

Portland, Me.

Though March was not marked by the issuing of permits for large buildings, as was the case during February, and consequently is not able to make the same extraordinarily large showing in total valuation of building permits as did that month, it was nevertheless a good building month. The total of building permits reached $878,235, as compared with $851,845 for March last year. This was a drop of 50 per cent. from the figures of February, which was the largest building month in the history of the city from the standpoint of the value of permits issued.

The outlook is generally considered good. Large public and semipublic improvements are to be undertaken this spring and summer and the architects claim to have considerable large work in their offices for early construction. So far the greater part of the buildings contracted for have been residences. Some of these are of considerable cost, but as a rule they do not run above $2500 in total cost.

Pittsburgh, Pa.

The present season is witnessing a gradually expanding volume of building operations not only through the residential sections of the city but also in the business districts and the feeling among contractors and builders is one of encouragement as to the future. In the month of March, Superintendent S. A. Dies of the Building Department issued permits for 404 buildings calling for an estimated outlay of $1,048,138, which figures compare with 369 permits for building improvements costing $567,830 in March, last year.

Sacramento, Cal.

The feature of the local building situation is the record established in March by the issuance of 56 permits for building improvements, estimated to cost $536,814, this latter total being the greatest for a month in the history of the city. This comparatively high figure, however, is due to the filing of permits for several large public buildings to be erected during the present summer. In March last year only seven permits were filed for buildings, estimated to cost $33,550, the current season thus showing a tremendous percentage increase over a year ago without involving a very large capital.

San Francisco, Cal.

Though builders do not seem to be rushed with work and there is undoubtedly less doing in the way of large buildings than was the case a year and a half ago, the building records show that there has been a considerable improvement not only in the number of building permits issued, but in the value of the contracts actually let. During March the total of building permits issued for new construction work in this city amounted to $3,141,985, as compared with $2,296,109 for February and $2,166,309 for January. The improvement noted is largely in the way of frame construction, the total of which for the month was $1,358,967. The brick construction for the month amounted to $1,403,686, and the outlay for alterations $193,655.

The materials situation generally reflects the comparative quiet of the building trades. Even lumber, which is expected to be in large demand from now on, is dragging to a considerable extent. There is a large supply in the local yards, and arrivals from the Northern producing sections are now falling off. Prices are weak, with fair selling at $13 on a wholesale base, and redwood at $13 and $14 at wholesale. Brick, which is always high in San Francisco, is still quoted at $9 for common brick, f.o.b. San Francisco, with large supplies at all the yards. At some of the outside yards about San Francisco Bay it is claimed that brick can be had at prices ranging as low as $6. Cement is quoted at $1.90 per barrel, or $2.50 including sacks, and these figures are expected to rule for some time.

Salt Lake City, Utah.

The improvement in the building situation, which was under way with the opening of the year, has continued, and March shows a gratifying increase over the corresponding month a year ago. According to the figures of Building Inspector A. B. Hirth, 108 permits were issued for building improvements, calling for a total expenditure of $530,000, as against 140 permits for improvements, estimated to cost $399,331 in March last year.

For the months of January, February and March of the current year, the value of the improvements for which permits were issued was $1,107,300, while in the corresponding months of last year the estimated cost of the building improvements projected was $617,507.

Seattle, Wash.

A feature of the building situation in the city during the month just closed was the filing of plans for four reinforced concrete structures, estimated to cost $1,030,000. The volume of new work projected shows a marked increase over March last year, and bespeaks an active season in all branches of the industry. The statistical report for March of the current year just issued by Francis W. Grant, Superintendent of the Department of Buildings, shows 1530 permits to have been issued for building improvements, estimated to cost $2,562,075, these figures contrasting with 1131 permits for new buildings, alterations and additions, to cost $1,303,245 in March last year. There were permits issued for 467 frame residences last month, involving an estimated outlay of $900,685, and 283 frame business structures, costing $102,405. There were also permits issued for 13 brick buildings, involving an outlay of $371,000.

For the first three months of the current year 3470 permits were issued by the department for new work, estimated to cost $5,786,195, whereas in the first quarter of last year 2946 permits were taken out, involving an estimated outlay of $2,394,820.

In this connection it is interesting to note the value of building improvements for which permits were issued in previous years. In 1908 the value was $13,777,329, in 1907 it was $13,572,770, in 1906 it was $11,920,488 and in 1905 it was $6,704,784. At the present rate of activity the year 1909 will make a most excellent showing in comparison with these years.

St. Louis, Mo.

The building situation continues to show a steady improvement as contrasted with a year ago, and operations are being planned upon a constantly growing scale. The suburban sections are rapidly being improved, and the amount of capital involved is assuming liberal proportions. The office of the commissioner of buildings issued in March permits for 1143 buildings calling for an estimated outlay of $2,675,087, while in March last year the department issued permits for 946 buildings to cost $1,964,490.

The feeling that the present is a desirable time to build, especially in view of the fact that lumber and even some other materials entering into building construction are likely to cost more rather than less in the not very distant future, has doubtless contributed to the growing activity.

St. Paul, Minn.

Building figures for March show an increase of more than 100 per cent. over the corresponding month of last year as regards the cost of new building work authorized. The report for the month shows that 319 building permits were issued from the building inspector's office, as against 209 permits for March, 1908. The estimated cost of the work thus provided for last month amounts to $772,998, as compared with a total of $370,890 for the same month a year ago.

The local building situation continues to give promise of developing into the banner year in the city's history. The same tendency on the part of small investors to enter the real estate field and put their surplus funds into new buildings, including residences, flat buildings, apartment houses and the more modest class of business structures, continues to be the feature of the local situation. But at the same time the larger investors are becoming more and more interested in the realty market, and within the past few weeks announcements have been made of a large number of pretentious structures which will be started during the coming season.

Materials, notably brick, cement and dressed lumber, show a tendency to advance, but the advance is not sufficient to interfere with the demand, which is becoming stronger every day.

The labor situation, although still unsettled, is full of the hope of ultimate settlement without involving labor and capital in any serious difficulty. The labor men show a strong inclination to accept the present scale of wages for all classes of labor, and the employers are just as anxious to let the present condition of things continue.

The largest building project that has been announced during the past few weeks is in connection with the proposed vocational school to be located at St. Anthony Park, near the State Agricultural College.

Other building projects of more than ordinary interest that will be pushed during the coming season include the following: The St. Paul Hotel, on the site of the present Windsor, to cost $1,000,000; the Masonic Temple, the Knights of Columbus Building, four new high schools in different parts of the city, a building for the State Historical Society, on the site of the old capital, to cost $150,000; a hotel at West Third and West Fifth streets, to cost $250,000; the new central police station on West Third street, near Washington street, to cost $100,000; a hotel at Wabasha and Exchange streets, to cost $150,000, and business blocks for the Golden Rule Clothing Company, the Albrecht Fur Company and P. J. Bowlin, all at Seventh and Cedar streets, to cost from $100,000 to $175,000 each, and building for the Y. W. C. A. on East Sixth street, near Cedar, to cost $150,000.

Youngstown, Ohio.

The members of the Builders' Exchange, together with a large number of their friends, enjoyed a very pleasant evening at the annual "smoker," held on the evening of March 30, at the rooms of the organization, 209 West Federal street. President J. L. Dalzell welcomed the members and their guests and introduced Edward S. Walton, chairman of the Social Committee, as the presiding officer. James Wardrope of Pittsburgh, president of the National Builders Supply Association, established his reputation as a good story teller and kept his hearers in an uproar for some little time.

Another speaker of the evening was S. D. L. Jackson, a well-known lawyer, who complimented the exchange upon the work which it had accomplished, pointing out that when the members prospered the city was a gainer to a similar extent.

During the evening a most excellent luncheon was served, and a musical programme rendered, which included vocal and instrumental numbers.

The committee to whose efforts are attributable the great success of the smoker was composed of E. S. Walton, J. A. Henderson and T. L. Davis.

Law in the Building Trades.

By A. H. L. Street.

MECHANICS' LIENS.

A building contract required monthly statements by the contractor to the architect, and provided for the issuance of certificates of payment of a part of the amount earned. The next paragraph provided for final settlement 40 days after completion and acceptance by the architect, and another paragraph provided that in each of the cases of payment the contractor, if required, should present a certificate by the recorder of liens showing that the property was free from liens chargeable to the contractor. Held, that the provision for the certificate did not apply to the final settlement, but only to the monthly payments.

A provision of a building contract requiring the contractor, when payment was made, if required, to present to the owner a certificate of the recorder of liens showing that the property was free from lines chargeable to him, would not affect the contractor's right to payment or to a mechanic's lien, where no certificate was required by the owner.

That a building contract provided that final settlement should be made 40 days after the completion and acceptance of the building, so as to enable the owner to determine whether there were any liens on the building before payment, would not prevent the contractor from instituting proceedings to enforce a mechanic's lien for partial payments then due, as, in determining the amount due him, any claims for labor, materials, &c., which he had failed to pay could be considered and deducted therefrom.—(Massachusetts Supreme Judicial Court) Morrison *vs.* Williams, 86 N. E. Rep., 888.

SOME COMMENTS ON CONCRETE CONSTRUCTION.

BY L. H. HAND.

IT is taken for granted by the writer that in these progressive days almost every one knows how to build a concrete wall. However, there are some very badly built walls as to general results and there are many roundabout ways of doing the work. The writer has noticed where a casing is built that in many cases one wall will be filled 3 or 4 ft. higher than another and allowed to set in that manner. Then when the other wall is filled in there will appear on the work what seems to be a crack running diagonally from the corner down into the wall. I find that many people, especially farmers, think any old board will answer to hold the concrete in place, and the consequence is some boards are thick and some are thin and the shape of each and every joint shows on the finished wall.

Another objection to the ordinary method of putting in casing is that about the only way to hold the walls in line is to drive stakes into the ground and brace to them. These braces in addition to being wretchedly in the way of getting around with wheelbarrows, &c., are loosened with a heavy rain, and a crooked wall is the result.

Now if one could have perfectly straight studding and surfaced lumber with enough of it the casing method might be all right, provided it is not expected to use the studding and lumber for any other purpose and the builder could afford to throw it away when the wall was completed. If this was all well nailed together and wired in the center in the usual manner for an ordinary 8-ft. cellar and an elaborate system of runways put up so the entire wall could be filled from the top one could make a very fair job. But here comes the nailing blocks for frames, and it is just about the biggest nuisance imaginable to reach down into a deep casing and try to fasten an anchor block that has been overlooked, which is occurring all the time with inexperienced laborers.

Then there are so many and various ways of mixing the concrete itself. One man will say 10 parts of broken stone and sand to 1 part cement; another will declare for 3 to 1; then again one man wants it put in as dry as it is possible to do, so that when tamped hard a little water can be made to show on top; another wants it slushed in, and there you are. Now I am making a satisfactory concrete by using 1 yd. of sharp river gravel to 1 barrel of Portland cement. I do not guess at the quantity or count the shovels of gravel and cement or measure in a wheelbarrow, a bucket or any of the many ways I have seen men doing. I select two 1 x 12 in. plank 12 ft. long; cut the end pieces 3 ft. and nail up a box, open top and bottom, of the dimensions inside of 3 x 9 x 1 ft, as indicated in Fig. 1 of the accompanying sketches. Across the end of this box nail good stout handles 1 x 3 in., allowing them to project 6 in. so as to be readily grasped by the hand when the box is in use.

If the cellar is large put down two or more platforms of 2 x 10 joist, or whatever size is used in the building, at the most convenient places for getting to the walls with material. Then see that the gravel is dumped close to these platforms so it can be pitched into the box without walking from 3 to 10 steps with each shovel of gravel. Fill the box one-quarter of the way up and spread a sack of cement evenly over it, repeating the operation until the box is about level for the last sack. Then round it up a little to accommodate a full yard of gravel and a barrel of cement. Lift the box and set aside. Now turn the mass with shovels twice; wet and turn twice more.

We make our mixture of the consistency of very stiff mortar, using a common bank spade for a rammer—that is, we chop it up in the mold until it is full in every part and then slap it down level with the top of the boards.

We finish a course clear around the building before we begin another, and in this way the wall has the appearance of range stone instead of an unsightly conglomeration of uneven joints and breaks.

Now as to the method of building the form, we will take for an illustration the cellar of a dwelling, as indicated in Fig. 2, having two porches and steps, octagon bay window, &c. Now it is evident that to build such a casing 8 ft. high will require a lot of lumber, much of

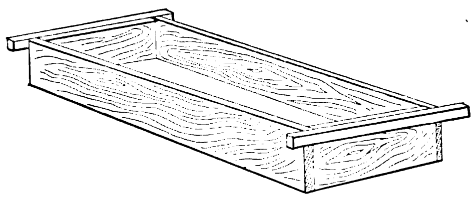


Fig. 1.—Mixing Box of 1 Yd. Capacity.

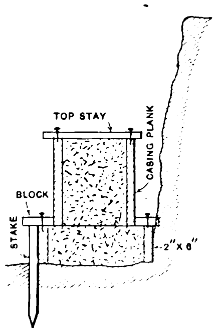


Fig. 3.—Section Showing Footing and First Layer of Wall.

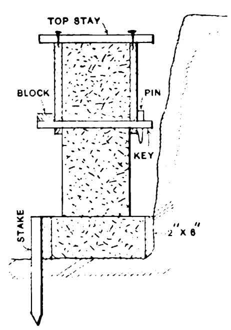


Fig. 4.—Section Showing Casing Raised for Second Layer of Wall.

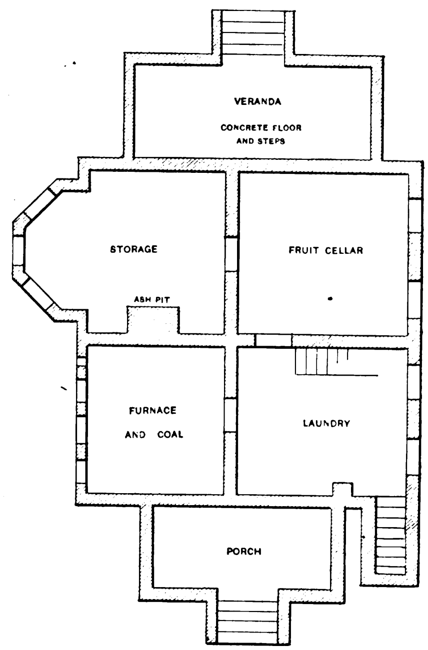


Fig. 2.—Foundation Plan of Dwelling.

Some Comments on Concrete Construction.

which will be little better than waste material when the wall is done. Stake down 2 x 6 to make footings, or if the ground is fit dig trenches 6 in. deep, making the footings 18 in. wide for a 10-in. wall, and 20 in. for a 12-in. wall. These are rammed up perfectly level to start with. On the footings so finished lay out with a heavy blue chalk line a perfect outline of the wall inside and outside; next select even width boards 12 in. or upward. the exact width being immaterial, except for one side of the wall to which to trowel. These rest on the footings, and are stayed on the bottom with little blocks nailed to the 2 x 6 casing for the footings, as shown in Fig. 3. Now, supposing the wall to be 10 in. thick, we cut a little piece of 1 x 2 in. stuff, which is kept for a gauge for the entire wall. Using this gauge strip as a guide we tack stays across the top at intervals of about 3 ft., all as indicated in Fig. 3, allowing the nails to stand up ¼ in. so they can be quickly drawn out when the grout has set sufficiently to allow of the raising of the "form."

When the forms are in place test them with line and square and adjust any imperfections. Now while the boys are filling up this form we have one man rip out enough tapered keys to space about 3 ft. apart clear around the wall. These are dressed slightly tapering in thickness as well as in width, and a 1 x 2 in. block nailed on the wide end. We now go around the wall and space off gains so that they can be quickly sawed into the bottom side and split out. The writer generally uses a 2-in. gain outside next the bank and a 3-in. gain inside. If the casing boards are even thickness bore the pin holes on the outer end of the keys by measurement.

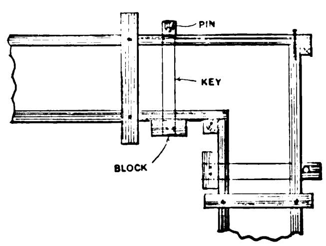


Fig. 5.—Manner of Constructing Corners.

Some Comments on Concrete Construction.

If not of even thickness set the form in place on the wall, slip the key up snug on the inside; then, using the 10-in. gauge stick for a measure, bore the pin hole. With stuff of uneven thickness the same key must be used that was bored for any thick or thin place. After the keys are in place proceed as before and fill up clear around. The reason it is not necessary to have all the boards of equal width is that if one side is to a width to start on the first time the forms are raised the gain will bring all to one width, and a little lumber lapping down over the wall is rather an advantage than otherwise. It is suggested that the gains be about 1½ in. deep for a 1-in. key so that any little corner knocked off the wall in raising the form will not cause a leak.

It will readily be seen that a wall can be carried up indefinitely by this method; cannot get larger or smaller at the top and will not become bulged or out of plumb except by gross carelessness. The keyholes will be in straight lines, and if the mortar with which they are filled is even a shade or so different in color it will still look mechanical. Any one who tries this method will hardly go back to the other style. The appearance of the work when the casing has been raised for another course is indicated in Fig. 4.

In Fig. 5 is shown how the corners of the casing are secured in place. The inside angle requires no nailing, as the natural tendency of the concrete is to hold it together. The outside corner should be nailed and the heads allowed to project ¼ in., so they can be readily drawn out.

In building cellar or porch steps the side walls or wings are usually put up first. Light stair horses are then cut out of common 1-in. stuff and secured in an inverted position between the walls by cutting two cross pieces a shade longer than are the horses between their two inside surfaces and crowding one cross piece at the top and bottom. Cut off risers that will just reach between the walls and place the risers as the steps are filled with concrete, beginning at the bottom and ramming all solid to the top. Then with a trowel and a little fresh material finish the stairs from the top down.

It may be interesting to state that in a recent job a "form" for concrete steps ready for the concrete was put in by the writer with the aid of one laborer in 1 hr. Four laborers mixed and threw in the material in 50 min. The stairs contained nine risers and were 3 ft. 2½ in. wide, so that the work was probably not more costly than a good wood stairway, which would only last perhaps six or eight years.

Commencement Exercises at New York Trade School.

The constantly increasing interest on the part of the general public in what is being done by the students taking the various courses of study conducted by the institution was strikingly illustrated in connection with the twenty-eighth annual commencement exercises of the New York Trade School, held in the Assembly Hall, First avenue and Sixty-seventh street, New York City, on the evening of Wednesday, March 31. The hall, which was tastefully decorated, was crowded to its utmost capacity, and marked interest was evinced by those present at every stage of the proceedings. Prior to the exercises the visitors inspected the various workrooms of the school, where the skill of the pupils in the different classes was admirably exemplified.

In opening the exercises of the evening President R. Fulton Cutting sought to impress upon the graduates the fact that the country to-day is in need of competent and trained workmen. He pointed out that to be successful in his chosen calling the young man of to-day must be possessed of skill, industry and perseverance. The work exhibited in the school, he stated, was a tangible witness of the skill of the graduates and the fact that they had completed the prescribed course, many of them by studying in the night classes after working all day, spoke in no unmistakable terms of their industry and tenacity of purpose. He advised the young men to go out and commence work at once so as to establish a reputation. There might be some disposed to discredit their skill, and it would be necessary for the young men to demonstrate their ability, which the speaker felt sure each one of them could do if given the proper opportunity. He advised them not to start out on the get rich quick plan, but rather endeavor to gain a reputation and make themselves a benefit to the community in which they might locate, pointing out that it is skill and industry that count, and these with sobriety will bring a competence.

The president's remarks were closely followed by the student body and upon their completion he introduced Prof. J. C. Monaghan, principal of the Stuyvesant Evening Trade School, and secretary of the National Society for the Promotion of Industrial Education, who delivered the commencement address, taking for his subject "America—the Land of Unlimited Opportunities." He defined an opportunity as something that must be sought for, and he enlarged upon the natural resources of the United States and the opportunities afforded a young man in this country to-day. Bismarck once said the future was for the land that has the schools, but Dr. Monaghan said it is the land that has the schools plus the raw materials of commerce. He stated that one out of 30 to 40 of boys and girls go through the high schools and most boys leave school before going beyond the sixth grade, and consequently what the United States needs is more schools such as Pratt Institute in the Borough of Brooklyn, Cooper Union, and the New York Trade School, in Manhattan. He stated that the Germans, after being able to make only an exceedingly poor exhibit at the Centennial Exposition in

Philadelphia in 1876, had established trade schools which were largely responsible for Germany's carrying off practically the highest awards at the Chicago, St. Louis and Paris expositions. This country, he said, spends more for education than any other country devotes to both education and its army and navy. He impressed the graduates with the fact that anything which must be procured by any but fair means is not worth getting, and they should not be ashamed of any work, as honest labor of any kind is just as respectable and often more remunerative than a "white shirt job." "It is your duty to society," he said, "to give your best efforts to any work in which you are engaged." In closing, he referred to those who preach disloyalty to our flag, the red of which is a symbol of the blood shed to make our country what it is, the white for the high ideals of our people, the blue for the boundless hope which the country affords, and the stars for steadfastness of purpose. He admonished the graduates to bear this in mind and success is bound to reward their efforts.

The certificates of graduation were distributed to the students by John H. McCullagh and Louis Rouillion of the General Society of Mechanics and Tradesmen of New York. In the carpentry class the honor man, William W. Neilson of New York City, was presented with a set of technical books by H. V. Brill, superintendent of the school, who also made the presentation of the medal given by the Master Steam Fitters Association to the honor man of the class in steam and hot water fitting. The honor rolls were presented by Arthur A. Hammerschlag, a former instructor in the school, who brought greetings from the students of the Carnegie Technical School, Pittsburgh, Pa.

New Publications.

Building Construction and Superintendence. By F. E. Kidder, C.E., Ph.D. Revised and enlarged by Thomas Nolan, assistant professor of architecture, University of Pennsylvania. Part I, Masons' Work. Size, 7 x 9¾ in.; 985 pages; 628 illustrations. Substantially bound in cloth. Published by William T. Comstock. Price, $6, postpaid.

The present revised and enlarged edition of a most valuable work for the architect, building contractor, engineer or student of building construction, is probably the most complete encyclopedia of masonry that has yet been offered to the members of the building trades. The work when first issued was the most comprehensive on the subject of masonry that had probably appeared up to that time, and the present work in like manner represents the latest and best modern practice along this line. In offering the new edition to the public the author of the revision has constantly borne in mind the original purpose of the book as set forth by the late Mr. Kidder in the preface to the first edition. For more than a year past Professor Nolan has devoted his entire time outside of college duties to gathering the material and putting the work in shape for publication, and the form in which the volume is issued bears striking testimony of the time, labor, thought and persistent effort which has been put forth in arranging and properly classifying all the data that belongs to the latest and modern accepted practices.

The new edition includes in general a thorough revision of the matter, the rewriting of some chapters and the addition of one entirely new chapter, the addition of nearly 400 new illustrations, showing features of building construction, the addition of many new tables and formulas, the classification of the subdivisions of each chapter, the addition of titles, footnotes, &c., and a new and comprehensive index.

An entirely new chapter with over 100 illustrative drawings relates to "Concrete and Reinforced Concrete Construction." The marked increase in the use of concrete in all kinds of buildings and the rapid development of concrete construction renders the subject matter of this chapter of more importance and of unusual interest to the architect, the contractor, the builder and even the progressive mechanic. In this chapter is given a brief outline of the principles of the mechanics of materials, leading to the theory of flexure of reinforced concrete beams, girders and slabs, and to the theory of reinforced concrete columns, and is purposely made to agree with the general presentation of the subject in the revised chapters of the late Mr. Kidder's handbooks, so that these books may be conveniently used together. Useful working formulas and tables are introduced after the same general scheme followed in the several chapters of preceding editions of this work. One division of the chapter deals with "Concrete Block Construction," and includes a discussion of the different types of blocks, the composition of the materials used, the process of manufacture and the details of building construction.

The chapter on "Fireproofing of Buildings" is substantially new and has over 200 illustrations. The chapter on "Architectural Terra Cotta" is entirely rewritten and illustrated with many new figures, and that on "Bricks and Brickwork" has been carefully revised in accordance with much new data, including especially sand-lime bricks, surfaced patterns in brickwork, and brick veneer construction. The chapter on Specifications shows many important changes, such as those on cement and concrete construction where new specifications are given.

The progressive architect, contractor and builder cannot fail to find this work a most valuable adjunct to his library of literature on building construction.

Bungalowcraft. Arranged and edited by Henry Menken; 120 pages. Size, 11 x 7¾ in. Bound in paper covers. Published by H. A. Eyman. Price, $1, postpaid.

The attention which is at present being given to the subject of bungalow construction renders of peculiar interest the above work, which is referred to by its author as "a book on bungalow and cottage building in its latest development." It is illustrated by means of half-tone and line engravings of a great variety of bungalows in Los Angeles, Pasadena and adjacent towns, the pictures being accompanied by floor plans and interior views, together with more or less detail of construction. In connection with each design are brief descriptive particulars, while among the introductory pages are some interesting comments on the difference between a home and a house. All of the designs shown are referred to as being suitable to any climate. Among the closing pages are illustrations of bungalowcraft lighting fixtures and "hints and don'ts in bungalow building," which are based upon knowledge gained from years of study and experience.

New York's Permanent Building Exhibit.

A most interesting affair for those connected with the building and allied industries was the formal opening of the exhibition department of the Building Trades Employers' Association on the evening of Wednesday, March 31, in the Builders' Exchange Building, 29 to 35 West Thirty-second street and 30 to 34 West Thirty-third street, Borough of Manhattan, New York. This department occupies the entire second floor of the building, and on the occasion named the hall was handsomely decorated with American flags and flowers, and more than 600 members of the association and their guests were in attendance. The guests were received in the clubrooms of the association on the twelfth floor of the building, and after a short time passed in social intercourse they were invited to the exhibition hall on the second floor. After the exhibits had been examined and flattering comments passed upon the general appearance and layout of the displays, the guests and members returned to the rooms of the Building Trades Employers' Association, where they enjoyed a "smoker" and vaudeville entertainment. During the evening a buffet luncheon was served and the formal opening was declared an immense success.

The House Committee of the association had charge of the entertainment, and much credit is due them for the success of the affair. The committee is made up of C. G. Norman, chairman; Ronald Taylor, Charles L. Eidlitz, Lewis Harding, B. D. Traitel, Thomas Worden and Fred Tuttle.

In this connection mention must be made of James J. Conor, manager of the exhibition department, to whose efforts has been due the success of the exhibition, which is probably the largest of its kind in this section of the country, if not in the United States, and it is the intention to make the exhibition a permanent one.

Those having exhibits already in place or have secured space include the following:

United States Floor Surfacing Machine Company, floor surface machines; Universal Compound Company, dampproofing and waterproofing; Truss Metal Lath Company, metal lath; Russell & Irwin Mfg. Company, builders' hardware; John Williams, Inc., ornamental iron and bronze work; John W. Rapp, Manhattan Fireproof Door Company; Arthur E. Rendle, Herrman & Grace Company; Howell & Lawrence, J. F. Blanchard & Co., fireproof doors and windows; D. Shudliner, glass; Universal Iron Foundry, vault lights; T. New Construction Company, roofing materials; Toch Bros., paints; Publishers Paper Company, woodstains and veneers; P. & F. Corbin, hardware; Metropolitan Switchboard Company, switchboards and electrical goods; De Veau Telephone Mfg. Company, telephones and electrical goods; Colorado Yule Marble Company, Mycenian Marble Company, Manchester Marble Company, Traitel Marble Company, Talladega Marble Company, marble; R. Schroeder, tiles; Norcross Brothers Company, marble and granite; American Encaustic Tile Company, C. Pardee Tile Works, Mart & Lawton, tiles; Pelham Operating Company, hoisting apparatus; William H. Jackson Company, mantels and tiles; William T. Ritch, insurance; U. T. Hungerford Brass & Copper Company, brass, copper and plumbing materials; Tiffany Studios, leaded glass and bronze; Brunswick-Balke-Collender Company, interior trim and refrigerators; Duffner & Kimberly Company, lighting fixtures; William Bradley & Son, granite; H. L. Brown Company, marble and granite; Marc Eidlitz & Son, Chas. T. Wills, Inc., general contractors; A. C. Horn & Co., dampproofing and waterproofing; Zibell Damp Resisting Paint Company, paints and dampproofing; Builders & Craftsmen Company, building construction; T. M. Valleau Company, asbestos; Frank H. Graf Mfg. Company, fireproofing furnishings; Hill Dryer Company, laundry clothes dryers; Bayer, Gardener & Hines Company, ornamental iron and bronze; National Wood Process Company, wood preservatives and stains; H. C. Clausen Iron Works, iron works; Leonard Sheet Metal Works, sheet metal; Fruin & Farrell, plumbing materials; F. W. DeVoe & C. T. Raynolds Company, paints and varnishes; Whale Creek Iron Works, iron works; E. G. Soltman, architectural supplies; G. E. Walters, lighting fixtures; Theo W. Morris & Co., glass; Goodyear Tire & Rubber Company, rubber tires; Alexander Pelli & Co., marble; Tucker Electrical Construction Company, electrical supplies; John H. Boynton, parquet flooring; Hedden Construction Company, building construction; Cheseboro Whitman Company, ladders and scaffolding; Hydro-Bar Waterproofing Company, waterproofing and fireproofing; Alexander & Reid Company, tiles; Philadelphia & Boston Face Brick Company, brick and terra cotta; Atlantic Terra Cotta Company, terra cotta; Geo. A. Fuller Construction Company, general contractors.

Plans for Concrete Residences.

Under the above title a selected number of designs, with descriptions and estimates of cost, submitted in a competition of the Chicago Architectural Club for prizes offered by the Universal Portland Cement Company, Chicago, Ill., and Pittsburgh, Pa., have been issued by the latter concern in an attractive style and well calculated to interest those contemplating the erection of residences in connection with which concrete is the predominating material. The competition was for a suburban house to be constructed of concrete, to cost $8000. It was open to all architects and architectural draftsmen residing within a radius of 50 miles from Chicago, and the prime object of the contest was to encourage a study of the use of concrete in an artistic as well as in a practical manner, and to obtain designs which would be appropriate for such material.

The designs winning the three prizes, together with those receiving "honorable mention," are illustrated and briefly described, the floor plans being accompanied by perspective views in the shape of direct reproductions of the author's wash drawings. We understand that the book is intended for free distribution to those who are sufficiently interested to make inquiry for it.

THE new hotel and restaurant building which will rise to a hight of 10 stories and cover an area 122 x 169 ft. at the corner of Broadway and Forty-fourth street, Borough of Manhattan, N. Y., is expected to be ready for occupancy by the first of the coming year. The plans prepared by Architect John Russell Pope call for a handsome structure of fireproof construction, on the main floor of which will be the general restaurant capable of seating nearly 1200 people. The second story will be devoted to private dining rooms and the upper floors will be fitted up with bachelor apartments. The building will be erected for Charles E. Rector, the well-known restaurateur, and the old two-story brick building which he has occupied for the past 10 years will, with other small buildings on the corner, be demolished to make room for the new edifice. This improvement will make "Rector's" the most pretentious restaurant in Longacre Square.

Exhibition of Cement Products.

It has been decided that the third annual exhibition of cement products will be held in the Coliseum, Chicago, Ill., during the week of February 17 to 23, 1910. The show the present year proved conclusively that the latter part of February is the most satisfactory time for holding an exhibition of cement machinery and products, and the dates named were selected in accordance with the expressed wish of a very large majority of the exhibitors at the two previous exhibitions. Elaborate arrangements are already under way to make the coming exhibition even better than the last.

CONTENTS.

Carpentry and Building

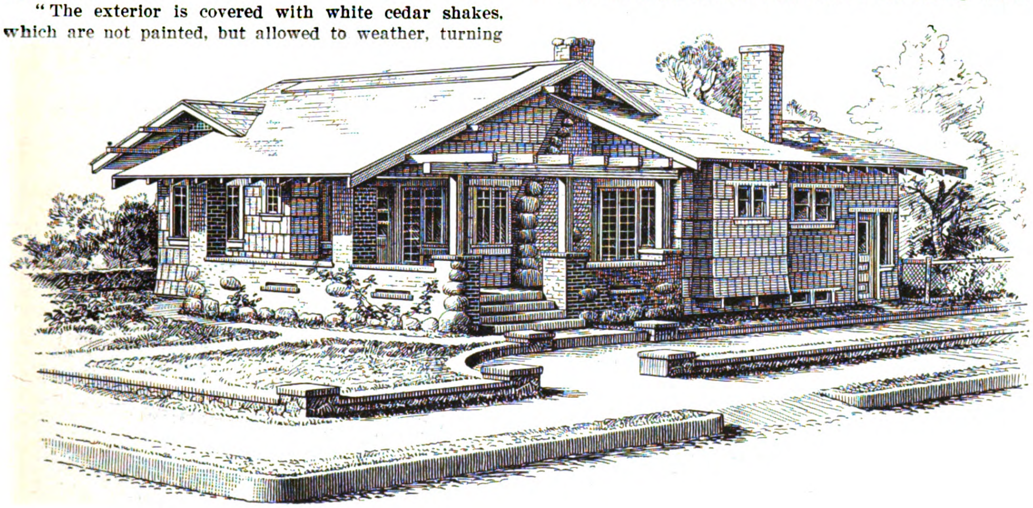
NEW YORK, JUNE, 1909.

Competition in Modern Bungalows.

THIRD PRIZE DESIGN.

WE have pleasure in presenting to the attention of our readers this month the design awarded the third cash prize in the recent bungalow competition, the author being Louis A. Clarke, Sixth and Spring streets, Los Angeles, Cal. The perspective view, elevations and floor plan afford an excellent idea of the appearance of the structure and the general disposition of the rooms. The design was submitted under the designation "A Bungalow for Two," and the author states it was his idea to show a "neat, compact and convenient arrangement, combined with a pleasing and artistic exterior which would make an ideal home for two persons, and might be used for three if desired." In forwarding the drawings the author accompanied them with the following comments:

"The exterior is covered with white cedar shakes, which are not painted, but allowed to weather, turning



Perspective View of Bungalow, Showing Walks and Driveway.

Competition in Modern Bungalows.—Third Prize Design.—Louis A. Clarke, Architect, Los Angeles, Cal.

a beautiful soft steel gray. The exterior trim is all rough and stained to match the body of the house. The porch columns, buttresses and exposed chimney are faced with dark red-blue brick, with a few large field stones mixed in for contrast. The whole exterior will give a very soft and pleasing effect. As white cedar shakes are not easily obtained in some localities redwood shakes or shingles may be substituted in that case, which with the rough trim will still give a pleasing effect.

In presenting this design for consideration attention should be drawn to the cozy living room with its fireplace, seat, bookcases, &c., also the windows opening on to the sunny terrace. Opening from the living room through folding doors is the dining room or guest's room, to be used as occasion may require. Notice the location in regard to both the bathroom and the kitchen. The principal chamber has two closets, one for each person. Notice also the built-in dressing table with its perfectly lighted mirror, also the drawers, lockers, &c. The chamber is reached by means of a small, well-lighted hall opening into both the living room and the guest's chamber. The bathroom opens off the hall. There is a deep cabinet over the wash bowl with a well lighted mirror door. Opening from either side of the hall are the linen lockers with their drawers, &c. The toilet is a distinct feature, being entirely separate and easily reached.

On the other side of the living room is the breakfast room, which is a distinct feature, and its position is such as to prove a great saver of steps for the housewife, being easily served from the kitchen, while it is also small, cozy and well lighted. It is reached through the living room or kitchen, and it also has French windows opening on to the terrace. The opening from the kitchen is an archway in which curtains may be hung. At first glance the arrangement may seem objectionable to some because of the fumes and odors from the cooking, but if the plan is closely examined it will be seen that the stove is placed in an alcove which is headed down, having a cove ceiling and a galvanized iron vent in the ceiling which carries away all the fumes and odors. The kitchen is well fitted with cupboards, &c., the pot closet being conveniently accessible, and other features are the kitchen cabinet and sink.

The house is provided with a basement which is easily reached from both the interior and exterior of the house. The porch and terrace are wide and spacious and have cement floors.

In California no other means of heating would be required than those indicated, the living room being heated by the fireplace and the breakfast room by the kitchen stove. It is not necessary to have the chambers heated, but provision has been made in the shape of an extra flue in the kitchen chimney, which may be used for a furnace located in the cellar.

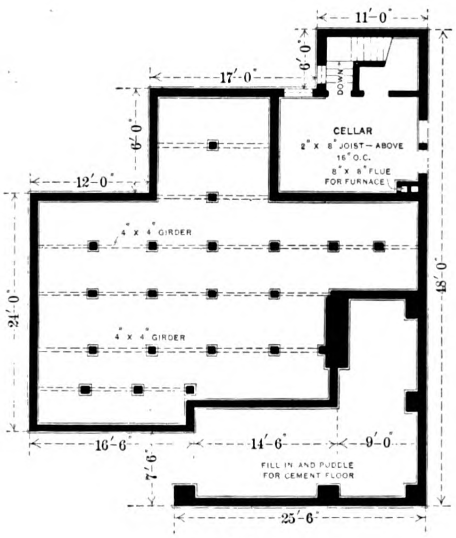
The author points out in his specifications, which have been restricted to merely an outline of the materials and labor required, that they are to be followed as nearly as possible, keeping within the building laws of the place where the bungalow is being erected, and that all materials must be of the best of their several kinds and all work done in a neat and workmanlike manner. At the outset he states all excavations for foundation walls, chimney footings and cellar are to be made as shown on the plan, the earth from the cellar being used to fill in for the cement floor and that the trenches are to be wet and tamped.

The foundation, the cellar walls and the chimney footings are to be constructed of good red hard burnt brick, with all joints filled solid with mortar made of good rich lime and clean sharp sand. The kitchen flues of the chimney are to be of good common brick plastered smooth on the inside and outside where not exposed to view. Above the roof the chimney is to be finished with blue brick. The specifications continue as follows:

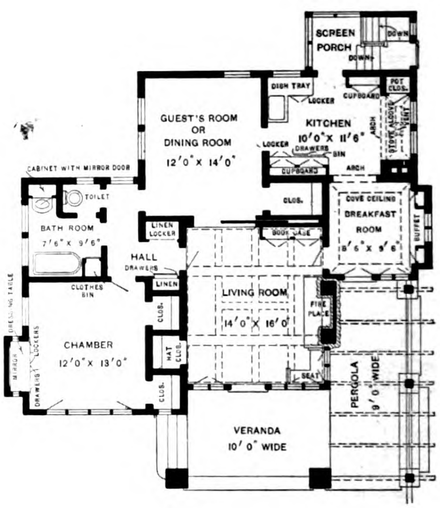
Fireplace.

To be built as shown on detail of blue brick and large field stone. Brick to be neatly fitted around stone. All joints

Front Elevation.—Scale, 1/8 In. to the Foot.



Foundation.



Main Floor.

Competition in Modern Bungalows.—Third Prize Design.—Floor Plans.—Scale, **1-16 *In. to the Foot.***

raked out deep. Use rich black mortar. Turn trimmer's arch for hearth. Use fire brick for lining fireplace. When mantel is finished clean with acid wash.

Porch columns and buttresses to be faced with blue brick and large field stone. Use black mortar raked out deep.

Carpenter Work.

Frame to be of Oregon pine lumber, well nailed and spiked together.

Mud sills, 2 x 6 in., redwood, rough.
Foundation posts, 2 x 4 in., Oregon pine.
Posts on piers, 4 x 4 in., Oregon pine.
Girders, 4 x 4 in., Oregon pine.
Floor joists, 2 x 6 in., 20 in. on centers, sized.
Floor joists over cellar, 2 x 8 in., 16 in. on center, sized.
Ceiling joists, 2 x 4 in., 16 in. on center, sized.
Exterior wall studding, 2 x 4 in., 16 in. on center, sized.
Interior wall studding, 2 x 3 in., 16 in. on center, sized.
To extend from sill to plate and to be doubled at all openings.
Plates, 2 in. by width of studding, doubled.
Sills, 2 in. by width of studding.
Rafters, 2 x 4 in.
Collar ties, 1 x 4 in. on every other rafter.
Rafter ends, 2 x 6 in. rough, select.

Bridging, Bracing, Etc.—Double headers over all openings. Truss where room. Main corners of the building to be well braced. Put in fire stops same size as studding 4 ft. from floor. Double all floor joists under all partitions.

Flooring.—Living room, dining room and breakfast room to have 1 in. subfloor laid at an angle of 45 degrees. Over this lay 3/8 x 2½ in. quarter sawed, No. 1 white oak floor.

Remainder of floors to be 1 x 4 in. No. 1 Oregon pine flooring. Put lath on joist to raise O. P. floor on level with oak floor.

All outside stepping to be 1¼ x 12 in.; cellar steps, 1¼ x 10 in.

Siding.—Cover all walls with 1 x 4 in. sheathing, laid 16 in. on centers; cover this with 3/8 x 6 in. x 3 ft. white cedar shakes, laid 16 in. to the weather and spaced ½ in. To be well nailed with 4d. nails.

Roof.—Cover all rafters with 1 x 4 in. sheathing laid 7 in. O. C and well nailed to every rafter. Cover sheathing with No. 1 redwood shingles 4½ in. to the weather.

Cornice.—Make cornice as shown on detail; cover rafter ends with 1 x 6 in. No. 2 flooring, laid rough side down.

Exterior Trim.—To be rough select. Make vents in roof of 1 x 3 in. Lattice ventilators under house of lath, to have frame for same.

Window and Door Frames.—Windows to have 2 x 8 in. sills, 1 in. pulley stiles. Rabbeted O. P. mullion and 1 in. jambs for casement windows; 1 x 4 in. rough redwood outside casings. Frames to have ball bearing pulleys and cast iron weights. Casement windows to be hung on 3 x 3 in. loose pin butts.

All door frames to have 1 in. net jambs.

Windows and Doors.—To be as shown on plans; 1½ in. thick; front door, 1¾ in. thick. All doors to be five panel colonial, slash grained Oregon pine.

Front door to be built as indicated, veneered on both sides with slash grain Oregon pine. To have plate glass in openings, with no mold or bevel.

All windows to have 16 ounce glass.

All windows that open to have galvanized iron screens.

Interior Finish.

Finish in living room, dining room and breakfast room with slash grain O. P.; in other rooms with vertical grained O. P.; all finish to be scraped and sand papered. All finish to be plain with edges slightly rounded.

Use 1 x 5½ in. casings and 1¼ x 6 in. head casings, 1⅛-in. stool, ¾-in. base shoe, ¾ x 8 in. base, 4-in. wainscot cap and 2½-in. picture mold to form a cap over all openings.

Cover lath with two coats of hard wall plaster (Arden or Alpine preferred). Second coat sand to be run through 16-mesh wire. Second coat to be troweled down and carpet floated to a good smooth sand finish. Plaster must have good clinchers on lath, and must be carried down to floor.

All angles plumb and true. Job, when finished, must be free from all cracks or blemishes.

Plasterer shall do all patching after woodwork is finished.

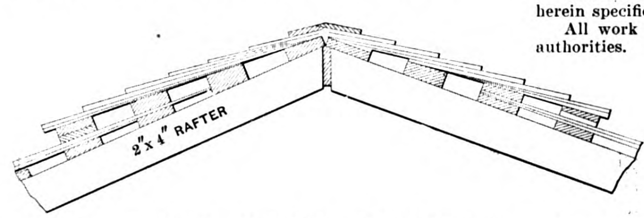
Kitchen and bath shall have 4 ft. 6 in. wainscot of smooth putty finish, blocked off in 3 x 6 in. tile.

Finish alcove in kitchen in putty finish, but do not block off above wainscot cap.

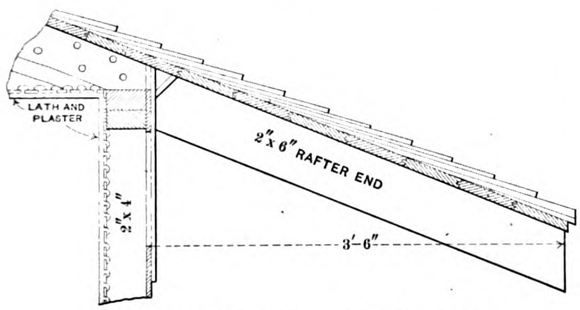
Plumbing.

Plumber shall furnish all material and labor for work as herein specified.

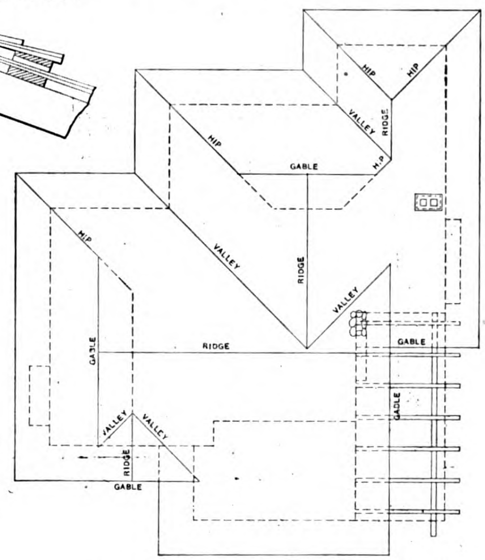
All work shall be governed by laws established by local authorities.



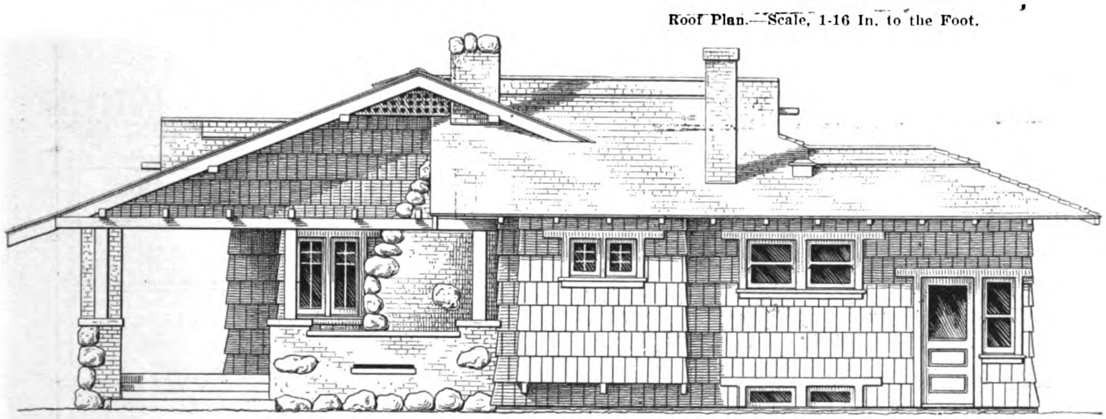
Vertical Cross Section Through the Ridge.—Scale, ¾ In. to the Foot.



Detail of Main Cornice.—Scale, ¾ In. to the Foot.



Roof Plan.—Scale, 1-16 In. to the Foot.



Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

Competition in Modern Bungalows.—Third Prize Design.—Elevation and Details.

Build seat in living room with 1¼-in. hinged top.

Bookcases to have adjustable shelves and glass doors.

Build buffet as detailed. Locker door paneled, cupboard door leaded glass.

Kitchen cabinet to have panel doors.

Wood shelf on mantel 4-in. face.

Sink, dish tray to have 1¼-in. sugar pine top, scooped out to drain.

Build drawers and cupboards under sink.

All closets to have two 12-in. shelves, with 6-in. hook strip under same.

Bathroom cabinet to have mirror in door full size of door.

Build dressing table, as shown, with drawers and lockers under shelf. To have plate glass mirror bedded in wall with neat frame around same.

Lathing and Plastering.

Cover all interior walls and ceilings with good sound 4-ft. lath, three-eighth keys. Joints broken every ninth lath, no vertical lath allowed.

Water supply shall be carried from lot line through ¾-in. galvanized pipe.

Soil pipe to be 4-in. cast iron, well tarred. Joints to be caulked with oakum and soft lead.

All fixtures to be tapped and vented in usual manner. Lay 4-in. vitrified soil pipe to sewer.

Pipe for hot water throughout house. Place proper cut off under house.

Install in bathroom 5-in. cast iron, 3-in. roll rim Standard manufactured bathtub, with combination Fuller cocks and nickel supply, overflow and waste.

Toilet to be No. 3 high tank, oak seat and cover.

Washbasin to be 21-in. combination slab, bowl and apron, cast iron, enameled No. 535 P. Standard Mfg. Co.

Sink to be 18 x 30 in. cast iron enameled, Standard Mfg. Company.

Hot water tank to be placed in kitchen where shown, to be 30-gal. galvanized iron, to be connected with owner's stove.

All exposed work to fixtures to be nickel plated.

Place hose bibbs in front and rear of house as directed by owner.

Tinning.

Flash over all windows and around chimney with I. C. tin. Lay 20-in. tin in valleys.

Electric Wiring.

House to be wired throughout for incandescent electric lighting, according to rules of the Board of Fire Underwriters.

Wire for meter on screen porch and place knife switch. Switches to be Hart flush snap button.

Wire for bell in kitchen with push button at front door.

Painting.

All exterior walls shall be left to weather and shall not be painted or stained, providing white cedar shakes or shingles are used. If redwood or red cedar material is used, all walls shall receive two coats of creosote stain. All trim and soffit of cornice to receive two coats of creosote stain. Roof to receive two coats of creosote stain.

All color to be selected by owner. Outside steps, porch floors and cellar steps to receive two coats of lead and oil paint.

Front door to receive two coats of spar varnish well rubbed down.

Interior of living rooms to receive one coat of stain wiped off and one coat of Standard turpentine and shellac. One coat of Standard Company's Flattine.

All nail holes in interior finish to be puttied up with colored putty.

The chambers, closets, rear hall and bathroom, including wainscot in kitchen and bathroom, to receive two coats of white lead and one of enamel.

Kitchen to receive one coat of filler and two coats of Standard Company's varnish.

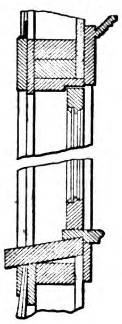
All walls and ceilings to be tinted to suit owner.

Hardware.

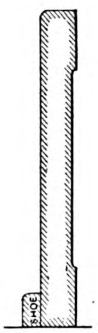
All rough and finish hardware to be furnished by contractor. Owner shall select finish hardware, to be put on after painting is all done. All casement windows will be fitted with flush bolts, neatly sunk top and bottom. Sliding adjustable casement arms to be used. Furnish all butts, catches, lifts, latches, drawer pulls, sash locks and lifts and all other necessary and usual finish hardware to match the inside finish sets.

Electric Fixtures.

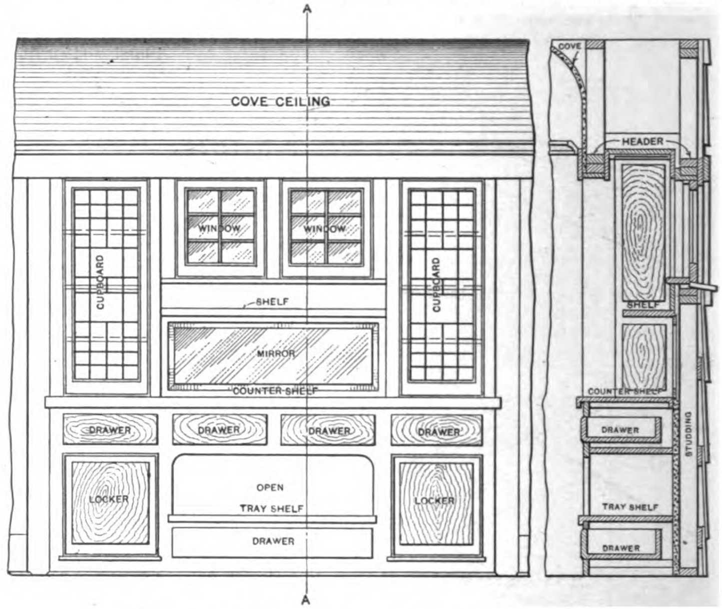
Electric fixtures shall be furnished by owner. Contractor shall allow $40 for same in his bid, to be taken out of last payment.



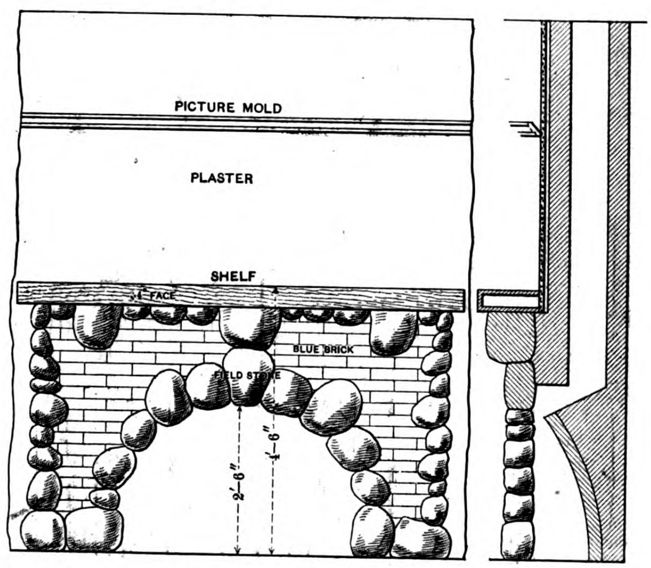
Detail of Casement Window.—Scale, ¾ In. to the Foot.



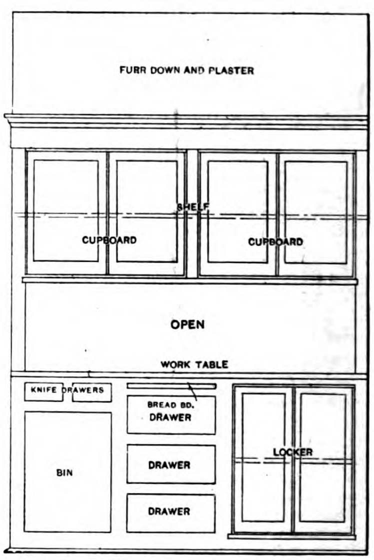
Base.—Scale, 3 In. to the Foot.



Elevation and Section at A-A of Breakfast Room Buffet.—Scale, ⅜ In. to the Foot.



Elevation and Section of Fireplace in Living Room.—Scale, ⅜ In. to the Foot.



Elevation of Kitchen Cabinet.—Scale, ⅜ In. to the Foot.

Competition in Modern Bungalows.—Third Prize Design.—Miscellaneous Constructive Details.

DETAIL ESTIMATE OF COST.

The estimate of cost furnished by the author of the design awarded the third prize is as follows:

EXCAVATION.	
Labor at $2 per day	$9.00
BRICKWORK.	
Common brick	$72.50
Labor at $4 per day	28.50
Blue brick	42.00
Labor at $4 per day	27.50
Field stone	3.00
Total	$174.50
CARPENTER WORK.	
Rough lumber, including roof and pine floors	$412.50
Labor at $3 per day	93.00
Interior finish, including hardwood floors, window and door frames	130.00
Labor at $2.50 per day	90.00
Total	$725.50
WIRING	$17.50
LATH AND PLASTERING.	
Lath	$32.00
Labor at $2 per M	18.25
Plaster	87.00
Labor at $3.50, included in plaster.	
Total	$137.25
CONSTRUCTION HARDWARE	$27.50
FINISH HARDWARE	40.00
Total	$67.50
PAINTING AND TINTING.	
Material and labor at $3 per day included.	
Exterior	$21.75
Interior	68.00
Total	$89.75
CEMENT WORK	$27.20
PLUMBING.	
Material and labor at $4 per day	$120.00
SASH, DOORS AND SCREENS	$126.45
Grand total	$1,494.65
RECAPITULATION.	
Excavation	$9.00
Brickwork	174.50
Carpenter work	725.50
Electric work	17.50
Lath and plastering	137.25
Hardware	67.50
Painting and tinting	89.75
Cement work	27.20
Plumbing	120.00
Sash, doors and screens	126.45
Grand total	$1,494.65

The builder's certificate accompanying this design and signed by C. A. Love, 654 East Thirty-seventh street, Los Angeles, Cal., reads as follows: "I agree to build the house entitled 'A Bungalow for Two' anywhere within the city of Los Angeles for the sum of $1494.65.

"I am a contractor of good standing, having built numerous houses in Los Angeles and am just completing a bungalow similar to this one, the plans being furnished by the same designer."

Boston Establishes Some Building Records.

Some building records in the city of Boston have recently been broken in connection with the construction of the new 10-story building of the Boston Safe Deposit & Trust Company, which is expected to be completed by the first of the coming year. In the first place the largest single piece steel girders ever used in building construction in the city have just been hoisted into place, the work requiring fully a week to complete. There were nine of the girders, which are 25 tons each and measuring 7 ft. 10 in. deep in the center and 63 ft. in length. In hauling the girders across the city from the South Station a 12-horse team was required for each girder.

The girders were swung from the ground into position by means of a boom derrick, which, as regards size and weight, was the largest ever erected in the city for that purpose. After being placed in position the nine girders were clamped together in such a way as to make three huge girders of 75 tons each, these being used to span the banking room of the Safe Deposit & Trust Company on the ground floor of the building. They are intended to support the weight of the nine upper floors and obviate the use of any vertical columns in the banking room, thus giving an open, unobstructed area 50 x 40 ft.

The Boston record for cellar excavation is also said to have been broken in connection with this new building. In order to make room for the additional vaults and safe deposit rooms demanded by the increasing business of the company it was found necessary to dig 50 ft. below the street level. The retaining walls are made with steel beams and concrete.

SYSTEM IN THE EXECUTION OF BUILDING CONTRACTS.*—IV.

BY ARTHUR W. JOSLIN.

TO show to what lengths an analysis of costs may be carried we give below costs that we have recently worked out.

Brickwork 601 M; laid from September 1 to December 20, 1907. Water struck brick 12 in. and 16 in. vaulted walls with some 12 in. and 16 in. partition walls having heat, ventilation and fireplace flues. Mortar 1 part lime, 2 parts Portland cement and sand about 6 parts.

Masons' wages 60 cents per hour; laborers' wages 30 cents per hour.

Quantities and cost in detail as follows:

Lime, 0.74 bbl. at $1	$0.74
P. cement, 1.392 bbl. at $1.90	2.645
Sand, 22.7 cu. ft. at $1.50 load of 32 cu. ft	1.07
Brick per M delivered	9.00
Derrick and engine	2.49
Staging stock and labor	1.224
Sundry expenses	1.08
Labor, all handling, carrying, culling and laying of brick and making and carrying mortar, &c	8.744
Cost per M complete in building	$26.993

It will be noticed from the time of the year in which part of this work was done that brick would have to be heated, also the water for mortar, and that unusual precautions would have to be taken to protect the work nights. The sundry expense item above is for fuel for this heating, canvas and boards for protection, railroad fares for imported help, &c. This price is for the brick right through, about one-fifth of the total quantity being laid in the exterior face of walls, the brick being culled to get the best for this purpose.

* Copyrighted, 1908, by Arthur W. Joslin.

Stonework—Broken coursed ashlar backed with rubble. First story 2 ft. 6 in. thick; second story 2 ft. thick. Mortar 4 sand to 1 Portland cement, with very little lime. All stone taken from adjoining fields and farms, the maximum haul being about one mile. The only cost of stone was the labor of gathering and teaming. Stone were large field boulders split with plugs and feathers and hammer broken to shape. Total number cubic yards 704.

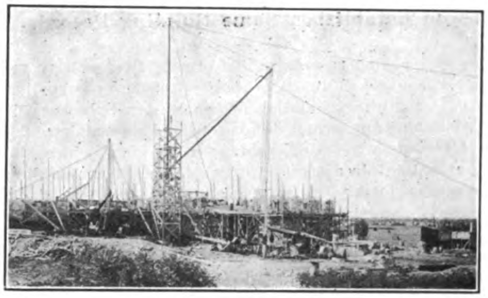
Quantities and cost per cubic yard laid complete as follows:

P. cement, 0.679 bbl. at $1.90	$1.29
Lime, 0.223 bbl. at $1	.223
Sand, 0.659 cu. ft. at $1.50 load of 32 cu. ft	.31
Sundry expenses (includes teaming of stone)	1.424
Staging stock and labor	1.044
Derrick and engine	1.108
Labor (includes procuring stone, splitting, laying, mortar making, tending, &c	7.44
Cost per cubic yard complete in building	$12.839

From these two examples will be seen the possibilities of obtaining costs if proper care is taken in keeping the divided labor and stock books. It does not seem necessary to discuss the value of this information to a contractor, but I am constrained to add that, out of all the builders in the city of Boston, I only know of four or five who make any attempt to obtain such itemized costs from their work.

In the case of items like excavation, stonework or concrete, where there is apt to be a little difference between the estimated and the actual quantity, and where the stock column does not show up the number of units, the foreman and the timekeeper should take measurements every few days while the work is going on to determine the actual quantity and enter them in the journal, so that at completion the known quantity can be used from which to analyze and tabulate the unit costs.

While the time sheets are divided into the usual classifications made when figuring upon work generally met

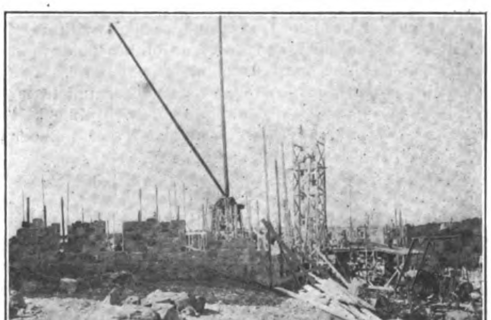


System in the Execution of Building Contracts.—Wing "D" of Eastern Maine Insane Hospital. J. C. and T. H. Stevens, Architects. Angus MacDonald, & Co., Builders.

with, if any particular job calls for some special division not made, one of those not used can be scratched out and the new one written in. In the same manner subdivision of labor on the listed items can be made; thus over "Windows" write "frames," "hanging," "casings," &c.

All the information secured in this way is of vast importance. The very fact that builders generally make no attempt to work out these unit costs accounts for the wide range in their figures and the large percentage that find their way into the bankruptcy court. Both timekeeper and foreman should not underestimate the importance of keeping time slips and cost book accurately, entering everything as promptly as possible and questioning men about items of labor, stock or sundry expense that there is the least question in their minds as to where it belongs. When the timekeeper attends to all the duties above enumerated he will find that he is occupied every minute. A young man of the right sort, however, will become interested and learn a great deal during the six or seven months' course of a fair sized job.

On our last large job the timekeeper was a graduate civil engineer earning $30 per week in a city of 30,000 people, and he gave up his position and came to work



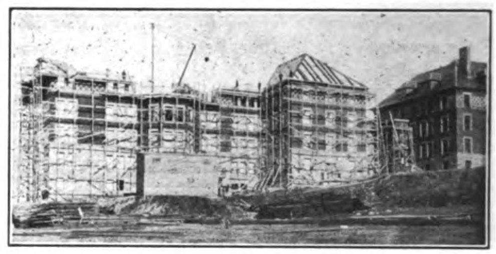
Another View of the Work as It Appeared on September 18, 1907.

for us at $20 for the sake of the experience he could get in practical building construction and costs in connection therewith. He made a good man for us, as he could use a transit, understood plans and could assist the foreman materially in laying out work, and he knew the local freight yards, teamsters, material dealers, &c.

On this particular job, which was 250 miles from Boston, we tried an experiment in the matter of handling the payroll, by making a deposit of several thousand dollars in a local bank and arranging for the timekeeper to draw on it by check for his payroll, freights and sundry small bills with people with whom we did so little business that we did not want to open an account. We required all bills and payroll to be verified by the general foreman or foreman-carpenter, and every check to be countersigned by one of these two men as well as by himself.

Every week immediately after drawing the payroll he sent the office a copy of the payroll in detail, together with all cash expenditures for such items as car fares, oil for lanterns, postage, stationery and the like, giving us the amount and number of the check. All bills and freights he paid he sent to us at once (not waiting until reporting payroll), writing any explanation and the number of check on the face of the bill.

In the office when the first deposit was made in the local trust company the bookkeeper charged said "trust company" and credited "cash." Upon receipt of a receipted bill or a payroll report with amount and number of check with which it was paid, the bookkeeper credited the "trust company" and charged the "job." From the weekly reports and a knowledge of expected freights we in the office were able to tell without prompting from the timekeeper when it was time to send more money to the trust company, and accordingly sent it. In ten months' time the trust company handled about $40,000 and there never was a difference between the books in



Showing Progress of the Work on December 13, 1907. The Building Was Completed and Accepted June 9, 1908.

the office and the timekeeper's cash account but once, and that was of about 40 cents. This, upon investigation, our bookkeeper found to be an interest charge for an overdraft that the timekeeper had made when we let the cash get too low.

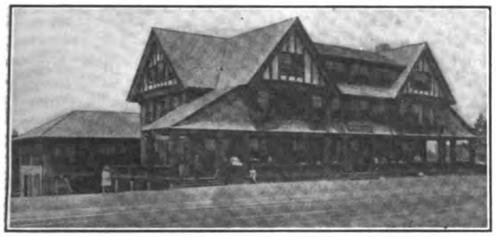
This job was visited by the writer every two weeks, staying two days, running in an extra trip several times when something came up that made it necessary.

The building was fire-proof construction (except the roof, which was mill construction), five stories high, with a ground area of 10,000 sq. ft., and we succeeded in completing same in two months and one day less than the contract time of one year, building for the same people meanwhile two smaller buildings amounting to about $8000. This was made possible by systematic handling of the job through ample stock being supplied in advance of the wants of the work; constant reports of the progress or delays on the job by almost daily letters to the office, followed by advice, suggestions or orders from the office sent immediately upon receipt of reports from the job.

We have perhaps touched on bookkeeping in these last few paragraphs more than anticipated when the article was commenced, but as this part of the building business is as important as any other part, we do not consider the remarks out of place. If results are to be accomplished there must be system all along the line: in estimating, working out the costs, keeping the books, purchasing the materials, letting sub-contracts, superintending the job and dealing with the owner and architect.

One thing must be guarded against, however, and that is not to have your system too cumbersome or expensive. The narrow margins in the business make it necessary to hold down to the lowest possible level the office or "overhead" expenses. The firm that can do business with an "overhead" expense of 3 or 3½ per cent. of the year's total business has a much better chance to stay in the "game" and make profit than the concern that allows the same expense to get up to 8 or 10 per cent.

The first three pictures shown herewith relate to a wing of the Eastern Maine Insane Hospital at Bangor, the contract for the erection of which was dated August 10 and the building accepted on June 9 of the following year, the cost of the structure complete being about $165,000. The work was done in 62 days less than the contract time, but there was no bonus for completing it before the time called for by the contract. This is the building from which the examples of unit costs on brick



System in the Execution of Building Contracts.—"Mothers' Rest," Built for Episcopal City Mission, at Revere Beach, Mass. Allen & Collins, Architects. Angus MacDonald & Co., Builders.

and stonework were taken. Of the three views relating to this building, the first two show the condition of the work September 18; that is, a trifle more than a month after the contract was dated, while the third picture shows the appearance of the wing December 13, practically four months after the contract was dated.

The next picture represents what is known as "Mothers' Rest," constructed for the Episcopal City Mission on the boulevard at Revere Beach, Mass. The structure was plastered throughout and built complete in eight weeks.

The fifth picture shows a 24-classroom schoolhouse in the Roxbury district of Boston, which was completed in 79 days less than the contract time, the city offering a nominal bonus for finishing the work ahead of time. The contract in this case was signed March 27 and the building was accepted December 12 of the same year. The cost of the structure complete, exclusive of furniture, was $160,000.

We are now nearly at the end of our remarks, and find that we have up to this moment neglected to mention two important points that should have been touched upon before.

First—You will recall my having discussed at some length the necessity of doing some work at seemingly illogical times in order to make possible the procuring of measurements for parts of the work that require considerable time to get out. In many cases it would be physically impossible to do some parts of the work until the building was farther advanced, and at the same time it is desirable, if not absolutely necessary, to have the measurements from which to lay out and get out some special part of the work. This might be some iron stairs up through the building in a masonry wall changing in thickness at different stories; or the exact dimensions of several rooms that are going to be filled with special case work. The architect has probably given the details, but has broken the lines at a number of points, thus "putting it up to" the contractor to give absolute working figures.

In many cases of this kind that come to my notice the general contractor is waiting for the subcontractor to assume responsibility and make figures, while the subcontractor is waiting for the general contractor or architect to do the same thing, and the foreman hardly dares to and is waiting for some one of the first three to take the responsibility. The net result is that the measurements are not obtained until the building has nearly reached a point where the special work must be installed, and then there is a wait of days, or even weeks, for the material.

In a case of this kind the superintendent should "take the bull by the horns" and establish measurements for everybody to follow. Before doing this, study the part of the plan involved carefully, noting fixed structural parts and put figures in ink on the working drawing at the job for every one to follow, with positive instructions to the foreman to see that the parts concerned are built to the figures made, thus becoming responsible yourself to the architect, the owner, the subcontractor and everybody concerned for the accuracy and reliability of the information imparted. If you do not dare to assume these responsibilities, you need more training as mechanic or foreman.

Second—The building business is made up of vexatious things, and it takes courage to meet them all promptly and straighten them out. The first inclination when you hear that something is going wrong and the architect and owner are kicking is to keep away from them and the building until the thing straightens itself out. This is all wrong and you hurt yourself in everybody's eyes by doing so. If we hear, directly or indirectly, that something is going wrong at the job, we make it a point to get there as soon as our legs or a car can take us and find out at first hand what is the matter, and follow it right up with the architect, owner, sub-contractor or whoever may be concerned, until everything is settled, and matters left running smoothly. Having done this, we feel better, the load being off of our mind, and the architect and owner respect you for having come up like a man, faced the "music" and seen it through.

The object of this article has been to try and make clear to the reader how system of the right kind in the office, on the job and in your own handling of both, may be obtained, getting thereby the maximum of results with the minimum of expense.

If the foregoing helps any of the readers to obtain

Perry Street Schoolhouse, Roxbury District, Boston. Built by Angus MacDonald & Co., in 79 Days Less Than Contract Time.

these objects we shall be well repaid for the time and thought put into its preparation.

A MOVEMENT has just been started to commemorate the three hundredth anniversary of the landing of the Pilgrims and the founding of New England by a World's Tercentennial Exposition in Boston in 1920. It is interesting to note that New England alone of all parts of the United States has never had its world's fair, and it is believed that the national and universal interest in the historic event which the exposition will commemorate will command the enthusiastic approval and support of the American people of all sections and of all classes.

ONE of the most interesting building operations in the city of Philadelphia is that of R. S. Van Cleave, who is preparing to erect 140 two-story dwellings on Fifty-fourth, Fifty-fifth and Race streets, which will involve an expenditure of about $300,000.

SOME INTRICATE PROBLEMS IN FRAMING.—IV.

BY C. J. MCCARTHY.

THE manner of laying out the ribs in fan tracery with a pendant in the center is illustrated in Fig. 16 of the accompanying diagrams. In this species of vaulting all the main ribs have the same curvature and form equal angles with each other at the springing. The plan shows the arrangement of the ribs. Those radiating from the imposts are all of equal curvature and equal length, as A B in the profile, and are bounded by the curbs C F, which are quadrants drawn from the imposts as centers. The plan of the pendant is shown by D D, the ribs having the same curvature as shown at *b c* in the profile. The jack ribs between the curb of the pendant and the curbs of the fan arches lie horizontally, forming part of a flat ceiling.

circular segments the figure would become a semiellipse or a semicircle before it reached across the diagonal span. Therefore the proper figure for the ribs would be a parabola with its axis horizontal as A C, because, however far it were prolonged, it would always continue to rise.

To continue let A B C represent the profile of the side rib then on D G, the diagonal of the vault, set off D H equal to A C. Draw H E perpendicular to D. G. Make the curve of the rib D E the same as A B and continue it to F, the length of the longest rib. The hight G F will then be the apex of the ridge ribs.

The length of the other ribs is found in the following manner: From the point D as a center draw arcs from *a*, *c*, &c., the intersection of the ribs with the axis I G to meet D G as at *b d*, &c. Draw *b e*, *d f*, &c., perpendicular to D G. Then D *e* will be the profile of the rib D *a*, and D *f* will be that of D *c*, and so on for the other ribs.

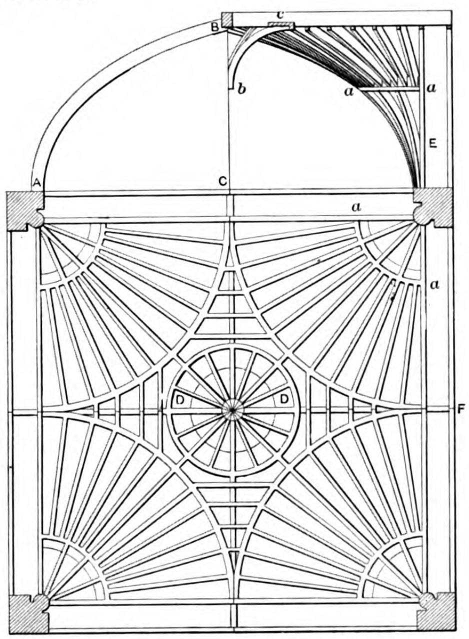


Fig. 16.—Manner of Laying Out the Ribs in Fan Tracery.

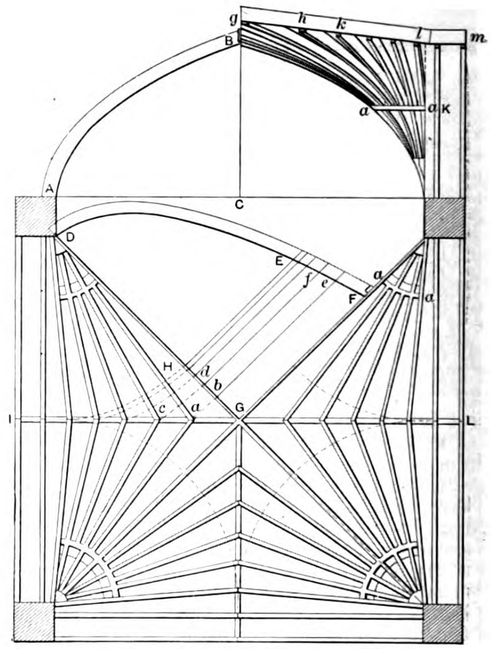


Fig. 17.—Another Example of Fan Tracery with Two Ribs Prolonged so as to Meet at the Ridge.

Some Intricate Problems in Framing.—IV.

Another example of fan tracery is shown in Fig. 17, where the fan ribs are of the same curvature, but are increased in length from the sides to the center. The ridge ribs are, therefore, not horizontal, but rise from I and L to G on the plan. They are also shown in the profile at *l g*. These will not be straight, as being the intersection of conoids they will curve slightly downward.

In vaulting of this kind on an oblong plan—that is, where the side arches are much narrower than the arch of the body range—it is obvious that in order to have the diagonal ribs form a pointed arch they must be less than quadrants of an ellipse or circle, as the case may be, and as these are the longest ribs in the whole vault all the other ribs must be considerably less than quadrants. Hence, if the plan of the compartment be considerably oblong it is easy to see that the two shortest ribs must form over the narrow openings a very acutely pointed arch.

On the other hand, if a gracefully pointed arch were formed over the narrow arches, being either elliptic or

In Fig. 18 we have an octagonal apartment with a groined ceiling and an octagonal skylight. The ribs of the octagonal groin are found by the method of intersections, as shown in Fig. 15. The chord line A B of Fig. 18 of the side arch is divided into equal parts, and lines are drawn from C through these to meet the curve. Through the points of intersection *d*, *e*, *f* lines are drawn from B and produced to meet the line A *c* in *a*, *b*, *c*.

The chord lines D E, G I on the plan are similarly divided into equal parts, and the divisions of the line A *c* are transferred to the perpendicular D *c* and G *c*. The intersections of the lines drawn from F and H and with those drawn from E and I to the divisions in D *c* and G *c* give the points *d*, *e*, *f* and *d*, *e*, *f* in the curves of the diagonal ribs.

The manner of finding the curve of the ribs of a groined vault on an irregular octagonal plan with a pendant is shown in Figs. 19 and 20, where A B C D E F represents the semiplan of the vaults. Let C H D be the profile of the arch over one of the larger sides. To find *n r o*, the profile of one of the arches of the shorter sides, proceed as follows: Bisect C D and $n\ o$ in I and q, respectively; draw I H perpendicular to C D and $q\ r$ perpendicular to $n\ o$. Make $q\ r$ equal to I H. Join H with D and n with r. Draw the perpendiculars D e, $n\ i$ and $o\ p$. Divide the chord lines H D, $n\ r$ and $o\ r$ into the same number of equal parts and draw the intersecting lines, the points of which will give the curve of the smaller arch, as before described.

Proceed in the manner already described to find the profiles of the ribs M O, C S, C O and D O, as shown by the diagrams marked $s\ u$ and t at their apexes.

The lengths and profiles of the jack ribs R R are found by drawing lines from their intersections in the plan with the ribs M O and K O, as shown on the left hand side of the figure at M N K.

In Fig. 20 is shown the method of construction, where A A is the girder supporting the floor above the groined ceiling; B B is the ridge of the ceiling, the seat of which is A G F in the plan; Fig. 19, $c\ c$ are the main ribs; $h\ h$ the diagonal rib corresponding to R R in the plan; $g\ g$ are the ribs $p\ p$ of the plan, and $v\ v$ are the jack ribs of the side arches; $f\ f$ are the ribs of the pendant marked T T on the plan, all of equal length and curvature; R is an iron bolt by which the pendant is supported, and $k\ k$ is the curb marked $k\ y$ O $t\ k$ on the plan.

There is another system by which the form of the ribs in the foregoing figures may be very readily determined and one that appeals to the mechanical sense of any carpenter, be he ever so dull in the matter of geometrical lines. I refer to the system of modelling. Every carpenter knows how to intersect two pieces of timber of equal width so as to form a square angle and also to intersect two pieces of different widths so as to obtain the same results. Now this is the whole principle of groining made easy.

To construct a model for a groined vault such as that described in Fig. 1, it is necessary to draw the plan of the compartment with the profile of the small arch, which is in this case semicircular and the lines of the seats of the groin arches. Now let us assume the span of the smaller arch to be 8 ft. Let us take a convenient working scale, say ¾-in. to the foot. Take eight pieces of well seasoned wood of sufficient length and width, the wood being of two colors, say white wood and walnut—four pieces of each. These pieces of wood should be carefully dressed and gauged to ¾-in. in thickness and glued together flatwise in alternate layers of white wood and walnut. Next true up one side perfectly at right angles to the joints and with a fine saw cut off one end perfectly square. Describe upon the square end a semicircle representing the sweep of the smaller arch, having first, however, taken a gauge and marked a line across the end about ¼-in. from the trued side. This is done in order to give a footing for the compasses in describing the semicircle, the center of which is where the gauged line crosses the center joint, the latter being the vertical axis of the arch. Now the wood must be chopped and planed away until a semicylinder is formed corresponding to the semicircle described upon the end of the timbers, which should be a perfect model of the smaller of the two intersecting vaults as described in Fig. 1, to a scale of ¾ in. to 1 ft., the squared end forming a cross section, which is divided into equal parts or ordinates by the glued joints.

To find the rib of the larger arch, the span of which is, say, 12 ft., we take 12 times ¾ in., which is 9 in. on the rule, and lay it across the base of our model in an oblique direction. At the angle which this measurement makes in reaching from side to side of the model we draw a line across it, and to this line and at right angles vertically we again saw off the model. The section gives us the profile of the larger arch, the joints dividing it into ordinates corresponding to those of the cross section.

Again to find the intersecting rib, we square a line across the base of our model and lay off 9 in., the width to scale of the larger arch along one of its sides, and make a point; then from this point to the line on the opposite side we draw an oblique line, and by it saw off the model as before, when the section will give us the profile of the groin rib, the joints dividing it into ordinates as before.

Now, we have a good working model of the work under consideration to a scale of ¾ in. to 1 ft. It is, therefore, an easy matter to take off the measurements and lay out the work to full size.

With regard to the development of the covering of the sectroids, a piece of paper may be taken and lined up to a scale of ¾ in. to the foot each way, having the lines at right angles to one another. Wrap it squarely around the model where last cut off; mark the paper by the edge of the section from the short angle to the center ordinate or axis of the arch. Then take off the paper, cut it by the line which gives half the sectroid. Double the paper and cut the other side by that already obtained. This gives us a scale drawing of the covering of the sectroid.

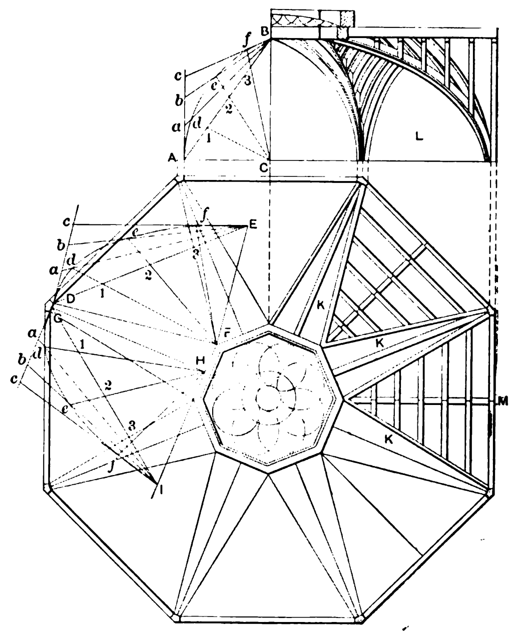


Fig. 18.—An Octagonal Apartment with a Groined Ceiling and an Octagonal Skylight.

Some Intricate Problems in Framing.—IV.

Models for any of the foregoing figures may be made in the manner just described.

Waterproofing a Concrete Water Tower.

A reinforced concrete water tower and tank, the latter having a capacity of 100,000 gal. and snpported 100 ft. above the ground, has recently been erected in Atlanta, Ga. It embodies some novelties of design and construction and we take the following description from the *Engineering Record* of recent date:

The structure is essentially a hollow chimneylike shaft, 30 ft., inside diameter, at the ground, and tapering to 22 ft., inside diameter, at a point 90 ft. above the ground, above which point the shaft is truly cylindrical in shape.

Instead of tapering uniformly from the ground up, the taper is such as would be generated by an arc of a circle of 1000 ft. radius revolving about a vertical axis, the arc being tangent to a vertical line at a point 90 ft. above the ground. This was made possible by specially designed sheet iron form work, which will be mentioned later. The effect of this taper is to make the structure resemble a lighthouse, and it is thought to be more pleasing in appearance than if the taper were uniform.

The thickness of the shaft wall is 10 in. near the ground and diminishes to 8 in. where the tank is formed and 6 in. near the top of the tank. The spherical arch bottom is 10 in. thick.

The concrete in the foundation is 1 : 3 : 6, in the tower 1 : 2½ : 5, and in the tank 1 : 2 : 4.

The tank is plastered inside with 1 : 1½ cement mortar and on the inside of this plaster were applied three coats of Trinidad asphalt dissolved with gasoline until quite thin. This asphalt penetrated into the pores of the plaster and gave it a glazed finish. Great reliance was put in this asphalt coating as a waterproof lining, but subsequent investigation has led the writer to believe that this asphalt plays very little, if any, part in making the tank water tight.

After the last concrete laid was about a month old the tank was filled. At first it leaked a little near the bottom, but the pores were rapidly filled so that in a few weeks' time the tank became practically tight. All leaks became reduced to two or three points from which occasional drops fell, except at one place, which showed a little fissure in the walls. The water was turned off and the locality of this fissure on the inside was plastered with two coats of neat cement. After it had hardened a few days the water was turned on again, with the result that this place was entirely tight. The fact that the tank leaked at first near the bottom led the writer to the conclusion that the asphalt coating is of no value for waterproofing. He is convinced that the plaster lining is doing most of the work, assisted by the rich wet mixed concrete in the tank shell. On other similar jobs he expects to make the tank of a very much richer concrete and to plaster inside with neat cement. All concrete was mixed mechanically just wet enough to pour and to be puddled, but not enough for the ingredients to separate. Instead of crushed stone a smooth pebble was used, which gave better results than could generally be obtained with crushed stone.

Atlas Portland cement was used in the foundation and Whitehall above ground, with gratifying results. All reinforcement used was Johnson corrugated bars.

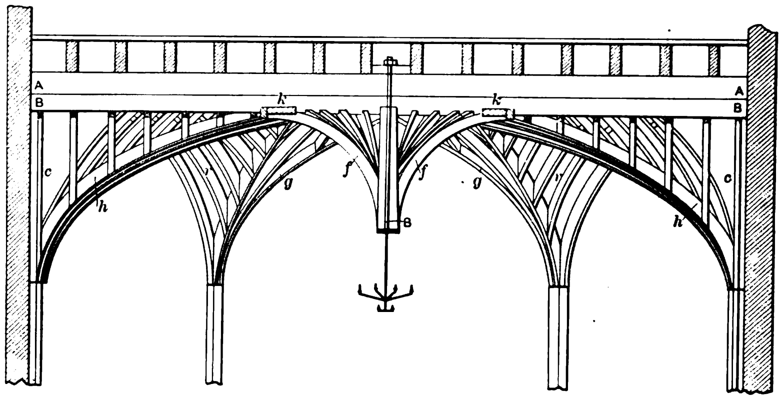


Fig. 20.—Sectional Elevation Indicating the Method of Construction.

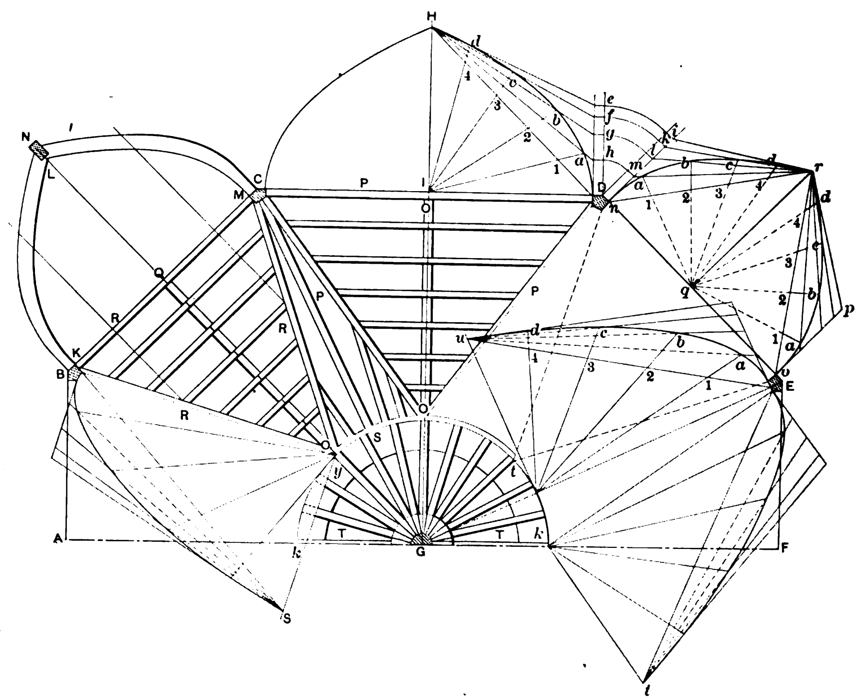


Fig. 19.—A Groined Vault on an Irregular Octagonal Plan.

Some Intricate Problems in Framing.—IV.

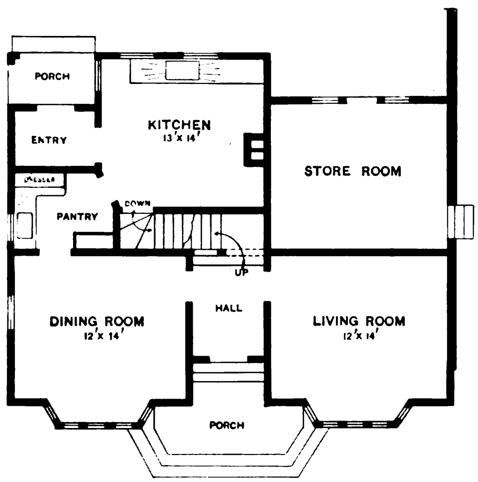
The plans have just been filed for a 10-story apartment house containing accommodations for 60 families to be erected at Broadway and 157th street, Borough of Manhattan, N. Y., at a cost of $500,000. The design is that of Architects Neville & Bagg of the city named.

AN ATTRACTIVE GARDENER'S COTTAGE.

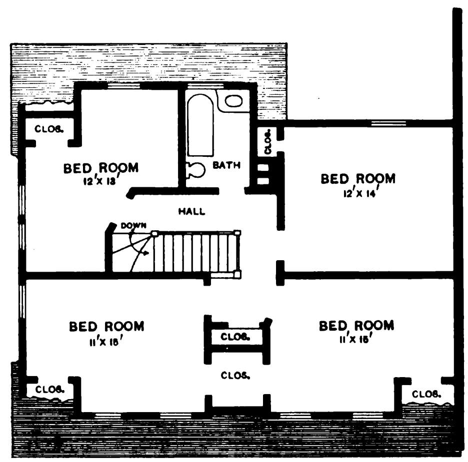
(*With Supplemental Plate.*)

WE have taken for the subject of our half-tone supplemental plate this month a rather attractive gardener's cottage, which is of the gambrel roof style with stone foundations and clapboards for the walls and gables, while the roof is covered with shingles. A conspicuous feature is found in the bay windows of the dining and living rooms at the right and left of the main entrance, the partially recessed porch and the quaint treatment of the dormers lighting the front bedrooms. Another feature is the conservatory at the right end of the cottage, and which extends back some distance beyond the main body of the house, entrance to it being through the storeroom, which is immediately in the rear of the living room. It will be noticed that the wall of the conservatory extends back beyond the storeroom and the sleeping room directly above.

From the hall rises the main flight of stairs, beneath



First Floor.



Second Floor.

Scale, 1-16 In. to the Foot.

An Attractive Gardener's Cottage.—Winslow & Bigelow, Architects, Boston, Mass.

which is the flight from the kitchen to the cellar. The living and dining rooms are trimmed with yellow pine, finished natural. The second floor has four sleeping rooms and bathroom, the arrangement being such as to render all of them readily accessible from the central hall. The cellar contains the heating apparatus and fuel room for the heating of the house and conservatory.

The exterior of the cottage is painted brown and the trimmings are white.

The gardener's cottage of which the plans are presented herewith is located on the estate of Mrs. Henry B. Stone, at Milton, Mass., and was erected in accordance with plans prepared by Architects Winslow & Bigelow, with offices in the Phillips Building, Boston, Mass.

Portable Houses in Colombia.

The extent to which portable houses are being used at the present time in all parts of the world renders interesting a recent report of United States Consul Charles C. Eberhardt at Barranquilla, Colombia, regarding the demand for portable houses in that section.

The attention of manufacturers of portable frame (wooden) houses should be called to a seemingly good opportunity that exists for the sale of a limited number of such houses in this district. Barranquilla, though the business center of this part of Colombia, is situated 18 miles inland from the ocean, Puerto Colombia, a mere village, consisting of a collection of crude houses, with mud and thatched roofs, being the shipping port.

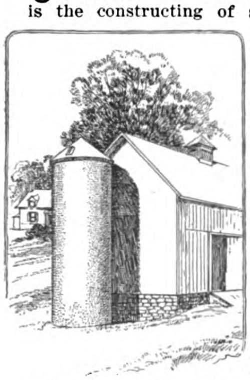
Climatic conditions throughout these regions are always trying because of the tropical heat, but especially so during the season from May to November, though some relief is usually found at Puerto Colombia, where tempering sea breezes render living conditions more agreeable. In recent years it has become the custom for many of the better families, particularly those with children, to spend most of the season referred to at Puerto Colombia, and the past summer has demonstrated the practicability and desirability of such a course. A fair sized colony spent the season there, a special train provided by subscription conveying the business men to and from their places of business.

The effect of this manner of living upon the comfort and health of the different families has been so agreeable and beneficial that nearly all contemplate repeating the experience next season. Some of the families are already comfortably situated in houses of their own, but others have been obliged to rent, with results that have not always been satisfactory. From the statements of a number of interested parties, it appears that possibly 10 portable frame houses could be disposed of if prices, conditions of payment and other details could be satisfactorily arranged.

It seems doubtful if any of the prospective purchasers would pay over $500 United States currency for a house which should contain from five to seven rooms in all. If such a house cannot be sold at so low a figure, it would probably be useless to enter into negotiations, for while a frame house would probably be more desirable in many ways than those now commonly used, the latter, usually built of mud sides and thatched roofs, rarely cost more than $300 or $400, and are in many ways ideal for this climate and just as serviceable. The ravages of a certain ant are especially destructive to wooden structures of any kind, and few grades of lumber can long withstand the burning of the tropical sun. The owner would naturally want to invest as little as possible consistent with a moderate degree of comfort to be attained for his family in a building which would in all probability be closed during six months of the year, when the season of extreme winds renders climatic conditions in Barranquilla less trying.

CONSTRUCTING CONCRETE SILOS.

ONE of many uses to which concrete is at present being adapted in connection with building operations is the constructing of silos, which are very popular among farmers of the country, more especially throughout the West and Northwest. Much attention is being given to the subject, and a recent contribution to the literature of concrete silos constructed with wood and sheet iron forms is found in "Hoard's Dairyman," wherein is described what is called a "one-man silo." The silo is stated to have been put up by a single man working 41 days, and the figures of cost of various materials are presented in connection therewith. It is obvious, however, that these figures will vary according to locality and other conditions. The article, however, is of such general interest that we present it herewith:



The silo was 31 ft. deep, 10 ft. in diameter; 15 ft. of the depth of the silo was below grade.

90 sacks Portland cement at 50 cents for wall	$45.00
2 sacks Portland cement at 50 cents for brush coat	1.00
Bolts	1.00
Wire for reinforcing, smooth No. 3	2.00
20 yd. of gravel	3.20
Half material for form	6.40
Roof and door frames and doors	9.70
Total cash paid	$68.30
Work on wall for one man, days	30
Making one-half form, days	3
All other work of building, days, one man	8
Total days	41

Another silo, 16 ft. in diameter (inside measurement), 8 ft. in ground and 32 ft. above, is given thus: Under ground, the wall is 8 in. thick; above ground, 6 in. Wire ropes made of four strands of No. 12 smooth wire were embedded in the wall every 18 in. Each of these ropes goes around the silo near the outer edge. The door frames were made 1 ft. 8 in. wide by 2 ft. in hight, of 2 x 6 in. stuff, and set in as the wall went up.

Laying Out the Foundation.

The excavation was made 17 ft. 4 in. in diameter and perfectly round, and the bank cut smooth and perpendicular, and the bottom level. From the exact center of the excavation a circle was drawn 16 ft. in diameter, which left just 8 in. between it and the bank all around. On the inside, close up to this circle, 2 x 4 in. studding, 2 ft. apart, were perpendicularly placed and braced to a studding set perpendicularly in the exact center of the silo. One-in. boards 6 in. wide were used to brace each stub, both at the top and bottom, to the center studding. On the outside of this circle of studding, next the bank, ½-in. boards, 6 in. wide, were nailed with small shingle nails. These could be easily bent to the form of the circle. A spirit level was used to get them at a true level on the ground. When this was boarded up solid for about 2 ft. the building of the wall began, and as needed more siding was nailed on, the bank being the outside form until surface of the ground was reached. Studding 12 ft. long was used here. When the tops of these were reached other studding was spiked on, lapped 1 ft. and braced to a center studding as before. When the top of the second course was reached the lower studding was pried off, and it and the ½-in. stuff used again above. The center studding should not be taken out.

When the top of the excavation was reached two sheet iron forms were used, made of No. 20 galvanized iron, each 18 in. wide and about 55 ft. long, so as to reach around the silo. On the ends of these forms angle irons were fastened, one iron being set about 1 ft. from the end to allow for that much lap. Two ⅝ x 8 in. bolts, with long thread cut on one end, extended through the angle iron, by means of which the form was tightened. To keep these sheet iron forms just 6 in. from the inner forms all the way round, pieces of 2 x 6 in. studding 1 ft. long were placed every 2 ft. inside the sheet iron forms and just opposite the studding of the inside form. These pieces were slipped up as the form was filled.

When the first form was filled the other was placed on top, and likewise when it was full the one beneath was loosed and put on top. The cement set fast enough to allow of the filling of two forms a day. Three or four lifts made of strap iron, with a handhold turned on one end and the other end bent to a right angle for ½ in., were convenient for lifting the forms. Great care should be taken to start the forms level; a good, true spirit level should be used. Portland cement, clean sand and broken limestone were the ingredients of the concrete. The sand and cement were mixed dry in the proportion of 1 of cement to 2½ of sand for the lower one-third of the silo and 1 of cement to 3 of sand for the rest of the way.

When Work Was Interrupted.

When the work was interrupted, so that the cement would be likely to set before building could be resumed, the upper surface was left rough and with partly exposed rock, so that when the next cement was poured in it would adhere firmly. The broken rocks were thoroughly wet before being put in the wall. Bolts ½ x 6 in. were embedded in the top of the wall all the way around, standing out 2½ in. in order to fasten the roof plate. When the wall was completed the inside was made smooth with a coat of cement, as a cistern is finished. The mortar should be made 1 part of cement to 2 parts of fine well sifted sand.

The amount and cost of the material used were as follows:

54 bbl. of cement at $1.60	$86.40
23 cu. yd. of sand	25.00
20 lb. of wire	2.00
2 doz. bolts	1.00
100 ft. of lumber for frames and doors	2.00
2 galvanized sheet iron forms	18.00
Total	$134.40

The lumber used for staging and for inside form was used for other purposes. The roof has not yet been put on, and although an excessively wet fall and winter was experienced, the silage has kept beautifully. With the material all on the ground, four men could build the silo in about 14 days.

Painting the Walls of a Swimming Pool.

The walls of a swimming pool which had been painted for a period of about two months with three coats of lead and oil paint, using the proper quantity of turpentine, became spotted like the skin of a leopard, the spots appearing similar to black mold, and a correspondent of that journal made inquiry of the *Painters' Magazine* as to the proper way to repaint the walls so that they will stand the dampness. In reply the authority above offered the following suggestions:

The best treatment for these walls under the conditions referred to is to have them perfectly dry, then if the lead and oil coats are sound, broom the surface well and give first a coat of zinc paint, made by using zinc white ground in oil, thinning it with pure spirits of turpentine and sufficient pale japan to make it dry hard and flat. Permit this coat to stand at least a week, and if, after that time, the spots reappear, then give a second coat of the same mixture, allowing a few more days for drying and hardening. For a gloss finish, apply paint made from best zinc white, ground in oil, thinned with a mixture of 3 parts raw oil of good body, 2 parts hard gum varnish (exterior) and 1 part turpentine. Lead and oil paint is proper for first coating, but too readily affected by water, both lead and linseed oil absorbing water quite readily, while the paint is comparatively fresh. So long as you have three coats of pure lead and oil paint on the walls you need not worry about the tendency of zinc white to cracking. A certain European firm manufactures paint for the floors and walls of reservoirs, which is composed of specially treated denatured alcohol, shellac and other gum resins for medium with zinc white for pigment.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—V.

By Edward H. Crussell.

We will first attempt the square joint. Having cut the boards to the proper length, which will, of course, be an inch or so longer than the finished size, arrange them on the trestles in their proper order. If the material is quartered oak or other figured wood endeavor to place the pieces so that the figure will show to the best advantage and assist in concealing the joint. The board may be a few shades lighter on one edge than on the other. With a light and a dark edge together, no matter how good the joint it is always noticeable, while with the two light or the two dark edges together it may be made almost imperceptible.

In wood that is to have a painted finish the matching of grain and color is of no importance, and in this case it is best to arrange the boards as in Fig. 21, with the heart side of the material alternately up and down. This arrangement helps to keep the built up top in better surface, as each board to a certain extent counteracts the curl or warp of the one next to it. Number the boards and also the joints as shown in Fig. 21. It would be better to form a habit of using blue crayon for this purpose, as it can be much more easily removed from the surface of finished lumber than can marks made by a black lead pencil.

the center, it will be found that the joint will open at the ends and the tighter you make the cramp the further they will open. Glue in the joint will make the situation worse instead of better.

The amount the joint should be hollow varies with different thicknesses, lengths and widths of material. Experience can guess right practically every time, but the novice may have to make one or two trials to get it exactly correct. The joints should be so that when the cramps are applied they are tight together for their entire length and on both sides—so tight that any part of one board may be tapped into line or out of line with the surface of the other and will stay so.

A test to determine if the joint is truly hollow is as follows: As the boards are standing one above the other in the bench vise, grasp the upper board with the thumb and finger at the lower corner and slide it first to one

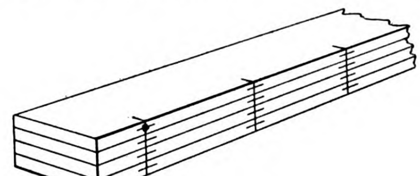


Fig. 23.—Boards as Piled for Marking for Dowels.

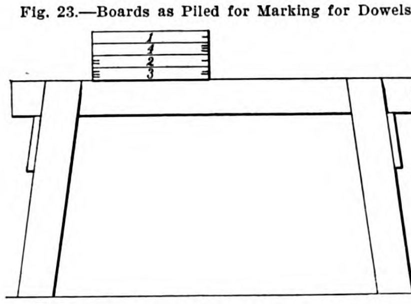


Fig. 22.—End View of Boards Arranged on Trestles Ready for Gluing.

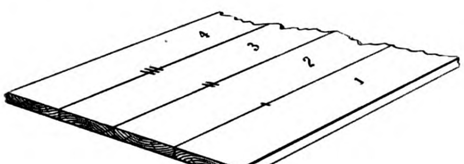


Fig. 21.—The Boards and Joints Numbered.

The Jobbing Carpenter and Some of His Work.—V.

Place board No. 1 joint edge up in the bench vise; shoot the edge straight and as square as possible. The edge should be just the least bit hollow lengthwise. When you have it about right lay it on the bench and dress up joint No. 1 of board No. 2. Place board No. 1 on top of board No. 2 as it sets in the bench vise, and test the joint both for squareness and straightness. If the joints are square the joints will stand one above the other in a plumb line. If they are not the top board will lean one way or the other and a shaving must be taken off one side of the lower joint in order to bring the boards plumb. In most material up to ⅞ in. thick there is likely to be some little warp, in which case the joint must be dressed so that the boards stand plumb or straight with each other in the center of their length, allowing one end to lean a little one way and the opposite end to lean about as much in the opposite direction. If the joint is correctly made the cramps will pull them straight.

As mentioned above, the joint should be a little hollow lengthwise; that is, the boards should only touch at their ends. This is to counteract the effects of the cramps and insure the joints being good at their ends. All poorly made joints open at the ends first, which is, of course, the place where the air gets the best chance at them. If you take two boards and make the joint between them as straight as possible, so that they touch their entire length, and then apply a cramp to them in

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—Editor *Carpentry and Building.*

side and then to the other. If the joint is true the far end of the board will stay in its place, while if there are any high spots in the joint the board will pivot on them and the far end of it will swing in the opposite direction.

Having perfected the joint as nearly as possible, lay board No. 1 back on the trestles, reverse the edges of board No. 2 in the bench vise and then continue as before, trying board No. 2 on top of board No. 3, and so on until all joints are made. When all the joints are completed apply the cramp or cramps with the joints dry and rectify anything that requires it. It is just as well to have cramps enough, but do not try to make up for the lack of skill in handling the plane by breaking the cramps. Above all things, be sure your joints come tight at the ends.

With the joints all made the last thing is to apply the glue, but we must first place our boards in some kind of order so that the gluing may be done expeditiously. In our present example we have four boards, the two outside ones having only one edge each to be glued, while the center ones are glued on both edges. Arrange them one on top of the other, as in Fig. 22, which represents an end elevation of the boards as they rest upon the trestles ready for gluing. The numbers and joint marks of the boards have been placed on the ends so as to show the arrangement. Notice that one of the outside boards has been turned upside down so as to bring both joint edges on the same side of the pile. Move the top boards over a little and glue the two edges on one side of the pile first; then move them back flush again and glue the side with the four edges. Turn board No. 1 the right way up and place it at the far side of the trestle; place board No. 4 in position, touching board No. 3; drop board No. 2 in between No. 3 and No. 1; pull them all together, making their ends even; apply the cramps and screw tight. Tap the surfaces of the boards into line and set the work one side for the glue to harden. Where there is much gluing to be done it is a good scheme to fasten triangular strips of wood to the tops of the trestles, as one need not then be so very particular about touching the tops of the trestles with the glue brush.

In making doweled joints proceed in exactly the same manner as for square joints. Try the cramps while the joints are dry and before inserting the dowels. If everything is O. K. mark the position of the dowels and bore the holes for their reception with a clean cutting bit. The general method of marking for the dowels is to pile the boards face to face on top of each other and square down the edges as shown in Fig. 23. The writer, however, secures the best results by laying the boards out flat, as in Fig. 21, marking across the face of them at the joints and then squaring down the edge of each board separately. Run a gauge mark long the center of each edge from the face side of the board. In such wood as oak or ash it is better to make an entrance for the nose of the bit at the exact intersection of these marks with a scratch awl or some such instrument. It is remarkably easy to get the holes for the dowels out of line with each other and the coarse grain of these woods will even turn the nose of the bit out of its course when it is first entering.

Most shops keep a small stock of hardwood dowels on hand, but the best and strongest are those that are split out of straight grained stock, roughly dressed to size and finished by being driven through a dowel plate. A dowel plate is nothing but a piece of steel about 2½ in. wide, 4 in. long and ½ in. thick, with several holes of different diameter drilled through it. With one of these plates in his "kit" the carpenter can always be sure of his dowels being the right size for his boring bits.

In putting doweled joints together remember to glue the holes for the dowels. It will not answer to simply glue the dowels, because most of the glue will be scraped off as the dowel enters. Two or three pieces of wire twisted together will make a brush for putting the glue into the holes. Do not make the dowels too long and be sure and bore the holes deep enough. To make the dowel an inch in length for every ⅛ in. in diameter is a fairly good rule; for instance, a ⅜-in. dowel should be about 3 in. long. It is well to use a depth gauge when boring the holes so as to keep the dowels equal in each board and prevent them backing up, which they might do if bored in too far. In gluing up glue the holes first, then the edges or joints; drive in the dowels and cramp up.

In an endeavor to make everything clear we have used a lot of space explaining the working of these joints, but we hope so much explanation will not cause the novice to think there is anything impossible, or, indeed, even very difficult, in the making of them. In our own case we find it very much easier to turn to and make them than to sit down and tell on paper how they are made. We will leave the cleaning up and fixing of the counter top for another issue, when we will have something further to say upon the topic of store fixtures.

New Type of Building Construction.

It is stated that San Francisco underwriters have adopted a new type of building construction which is creating much interest among architects, builders and real estate men. The type was originated by Architect John C. Pelton, who estimates the cost at about 15 per cent. greater than ordinary frame construction, but at least 5 per cent. less than common brick construction.

The building, according to reports, consists of a heavy frame of wood encased in reinforced concrete walls of four inches thickness, anchored to the frame at each story. It is in fact a wood frame in place of a steel frame, and the heavy timbers support the floors and roof independently of the walls, which are merely "curtain walls." There are wood columns and girders, and upon the girders, after they are covered with fireproof material, the wood joists are laid 16 in. on centers. Instead of board flooring, blocks composed of cement, plaster of paris and cinders, are set upon the joists, so that the floors are fireproof. The partition walls are made of similar blocks, made of staff and held in place by reinforcing rods.

In no place does wood touch wood in the building. The frame may be erected as steel frames are put up, and later the walls are built and the floors set in. The principle is the same as that of the steel-frame building, in which the floors are supported by the frame, independently of the walls. The inventor believes that the favorable attitude of the underwriters may result in allowing this type of construction to be used within the fire limits.

Some Large Timber Logs.

Some remarkably large sticks of timber have recently been cut in the extreme northwestern section of the country, and the statistics presented are certainly surprising. A log recently sent to San Francisco is said to have been so large that no mill could saw it and the trimming had to be done by hand with axes. The log measured 34 x 54 in. and was 104 ft. in length when hewn into shape. The remarkable feat of erecting a 14-room house from the lumber of a single yellow fir tree is said to have been recently accomplished near Elma, Wash. Six logs 28 ft. long and the largest 7 ft. in diameter at the smallest end were made from this tree. The measurement of the stump inside the bark was exactly 9 ft. and the trunk was perfectly straight, not a limb showing for a hight of over 100 ft. The total length of the tree was over 300 ft.

A monster cedar tree was recently blown down near South Bend, Wash., measuring 66 ft. 8 in. around 3 ft. above the bulge of the root. At a hight of 75 ft. above the earth the cedar was 11 ft. in diameter. A giant cedar is yet standing, which is 18 ft. in diameter. On the Johns River there are groves of cedars that vary from 10 to 24 ft. through, and but few of them are hollow. There is another cedar tree in Snohomish County which is 104 ft. 4 in. in circumference and is over 150 ft. to the first limb, which is believed to be over 5 ft. in diameter.

According to official measurements, the timber area in Clallam County runs 20,000,000 ft. to the square mile. One acre recently showed 500,000 ft. of standing timber. A Pacific County mill is said to have cut 500,000 ft. from a little less than 2 acres, the logs averaging from 12,000 to 14,000 ft. each.

A 40-acre tract in Clallam contains 9,900,000 ft. of timber. There are 8,500,000 ft. of fir, 390,000 ft. of spruce and 180,000 ft. of hemlock. The quarter section of which the tract is a part contains 19,000,000 ft. of fir, 2,700,000 of spruce and 700,000 of hemlock.

There is 35,000 square miles of timber standing in this State. This would make a plank road 3 in. thick and 500 ft. wide twice around the world. It would load 10,000,000 cars of 20,000 ft. each, each 45 ft. long, equal to 85,227 miles of trains, or one train reaching three and a half times around the globe at the equator. It would build 5,000,000 six or eight room houses, enough to shelter one-third of the people of the United States.

Durability of Pine Shingles.

A striking illustration of the longevity of pine shingles is found in connection with the altering of an old residence in Sturgeon Bay, Wis. While uncovering the roof, which was of ¼ pitch, shingles were found marked "B 1 Red River," and were made by a concern who operated a small mill at Red River in the '50s and ceased operations in 1864. This would indicate that the shingles had been in use for something like 45 years, and when taken off the roof were found in fairly good condition.

RUNNING A DOME CEILING IN PLASTER.

By William Gregory.

DOMED ceilings, whether elliptical or segmental in section, and having their surfaces finished with sunken molded panels, require to be very carefully laid out. The vertical stiles should be plumb, though they may be diminished in width, while the horizontal stiles must be level, else the intersections will not be correct. Fig. 1 of the accompanying illustrations is a representation of a dome ceiling that is to be run in plaster, and, being circular in plan as in elevation, cannot be run by the ordinary running molds such as are used for running straight moldings. In Fig. 2 is illustrated the mold for running the horizontal stiles. The parts for running the horizontal stiles are shown at S S S. Impost and crown moldings are also shown respectively at M and N.

It will be noticed that each stile is larger than the one above it, and this is so in order that each will be equal in width to the vertical stile at the points of intersection. This will give a gradual diminution to all the vertical moldings or stiles toward the crown.

Before proceeding to run the molding it will be necessary to scratch and brown the whole surface, and, while it can be scratched at any time, it will be necessary to have the running mold in position before browning. To do this the centers, both top and bottom, must be found. Should the crown be open a stout plank, P, must be laid across the opening and securely fastened with burlap soaked in liquid plaster, or other means that may sug-
by similar means for the purpose of fastening the iron
gest themselves to the operator. It may also be necessary to secure a short plank to the center of the floor shoe for the bottom.

Having found the center on the top plank, place the shoe, A, in correct position and fasten securely with two screws. Next place the shoe, B, on the center of the bottom plank and fasten also with two or more screws. It is imperative that a line joining these shoes must be plumb from center to center, otherwise the work will not be correct. The upper and lower shoes are shown in detail in Fig. 3.

Next fasten the bolts C and D to the top and bottom, respectively, of a stout plank about 2 x 12 in. and cut to the required length. To this plank the running mold will be fastened by securely bracing it as illustrated in Fig. 2.

Having placed the running mold in the correct position and its axis plumb, it will be well to tack a piece of stout zinc over each of the depressions, S, S, S, &c., for the stiles to assist in browning the entire surface, after which proceed to lay on the brown mortar and swing the mold around until a good solid surface is obtained.

It will be well to here consider the best method of running the vertical stiles, which are both circular and diminishing. It has been proved by experience that a circular molding cannot be mitered by hand so well as it can be run. The best way, therefore, will be to run one vertical stile in position in such a way that it can be taken down and from which piece molds can be made, after which the required number of stiles can be cast from the molds. To run this stile two methods may be employed—the double hinged mold and the half mold. The latter method, as illustrated in Fig. 4, will be first described. Make a vertical screed with a little gauged white mortar and plaster on any part of the dome; swing the mold to the center of this screed and with a small tool mark at top and bottom and scribe a center line from top to bottom of the dome. On each side of this center line set off half the width of the stile at top and bottom. Place the half mold F in position to these marks and again mark outside of the slipper of the half mold at top and bottom on both sides of the center line. Between these marks draw connecting lines to which the running rods R R will be fixed and securely fastened with gauged mortar. Next run the mold against the inside of each rod and mark off the inside member from top to the bottom. Spread a little white mortar (not gauged), soap or grease between these lines so as to permit the stile being taken off easily after being run. Now gauge sufficient pure plaster and place it between the two lines and run up the mold, first against one rod and then against the other, which will give a clean, true, diminished stile. This when set can be taken down and laid aside until wanted for piece moldings.

The horizontal stiles may now be run, having first taken off the pieces of zinc that were tacked over the depressions while browning the surface. It will be well before running the stile to first take the mold and scribe a mark at the top and bottom members of each stile, and between these lines to well scratch or score the brown mortar for the purpose of forming a key for the stiles. It will be well also every 3 ft. or so to further cut out a

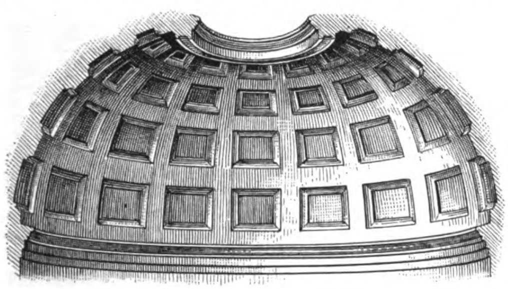


Fig. 1.—Partial View of Paneled Dome Ceiling.

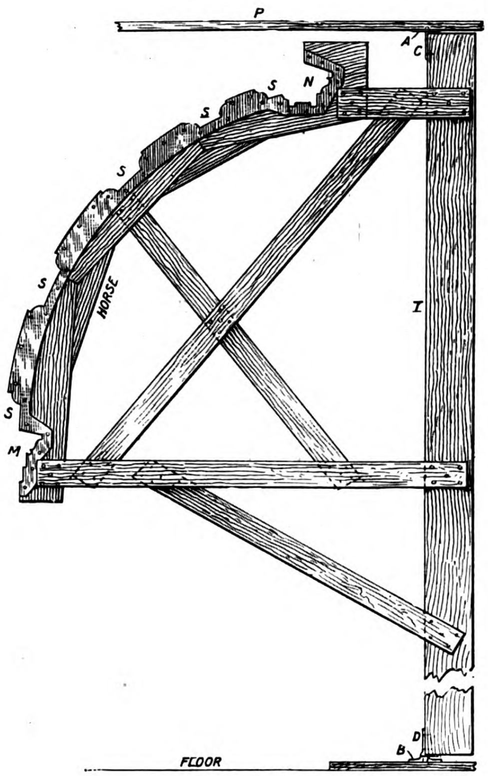


Fig. 2.—Mold for Running the Profile of the Ceiling.

Running a Dome Ceiling in Plaster.

space about 6 in. long and right down to the lath as a further key to support the horizontal stiles.

Having scratched out, cleaned out and well wetted all the work, it is now ready for running. To do this it will be well to take one stile at a time, beginning at the top and gauging up sufficient white mortar and plaster to run around the one stile in one operation. Having finished this one stile it will be found of great advantage to the operator to cut the zinc of the finished stile off the horse, as he will then have less bearing on the mold when running the next stile. This will be done after completing each stile until the whole is finished.

The vertical stiles may now be fixed. In order to do this first get the centers for one vertical stile at the crown, set the mold, Fig. 2, to this center and scribe a line down to the spring of the dome. Now measure along this line the distance between the two top horizontal stiles and cut this length from the top end of the vertical stile that was previously run and taken down. Take this piece and, cutting its members to a miter, fit it into its correct position; that is, setting it an equal distance on each side of the center line by also cutting away the members on the horizontal stiles at each intersection to a miter, clearing away all the surplus stuff and again trying the stile, which should fit into its bed correctly. Having done this—the stiles for this bay being exactly

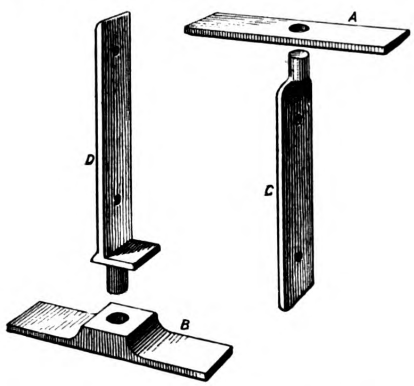


Fig. 3.—Details of the Upper and Lower Shoes.

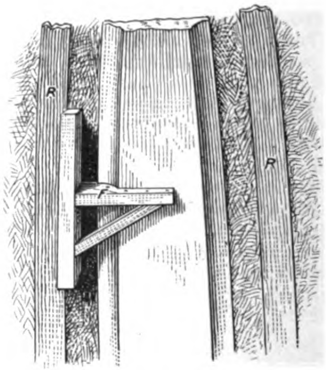


Fig. 4.—Running Stile by the Half Mold Method.

Running a Dome Ceiling in Plaster.

alike—a piece mold should now be made from this and sufficient pieces cast from the mold for the whole of the top panels. Having cleaned out and well wetted the bed, score the back of the cast well, gauge a little white mortar and plaster, spreading a little of this on the bed as well as on the back of the cast. Press it well into its bed, taking care that it is in its correct position vertically and that the intersections are correct. Clean off all superfluous stuff and neatly tool up the miters.

This operation is to be repeated with each stile until all have been placed in position in each bay. It will be noted that the mold, Fig. 2, should be kept in position until all of the vertical stiles have been fixed in order to obtain their center lines. Having completed the stiles the spaces between, that is, the bottom of the panels, should be well scored with a fine drag, well wetted and finished to a fine smooth surface with gauged mortar and plaster.

Building Bricks of Glass.

For some time past more or less attention has been given abroad to the question of making bricks of glass which could be used in a practical way for building purposes, and with a view to ascertaining the status of this industry the United States consular officers in Europe were instructed by the State Department to obtain such information as might be available bearing upon the subject indicated and the value of such bricks for the purpose named. According to these reports, which have recently been issued, the most successful artificial stone which has been made from glass is that turned out under the Garchey patents, the products being known as the Garchey stone. For common tiles old glass obtained from broken bottles, window panes, &c., is used, as uniformity of texture and color are not absolutely essential. For higher grades of product glass is first made from sand of suitable quality, carbonate of lime, sulphate of soda and potash, the proportion being about 5 of sand, 4 of lime and 1 of alkali. After being cooled slightly the glass is granulated by being thrown into cold water, the granules are put into refractory molds and again heated to a temperature below complete fusion until they become plastic. The molds are then withdrawn from the furnace, placed under a hydraulic press and subjected to a pressure necessary to form the plastic material into the desired shapes. After being trimmed the molds are passed through the cooling process in ovens specially constructed for the purpose. It is stated that the inventor has discovered another process for making the stone from glass in one heating by which the cost is materially reduced.

The stone is made in a variety of forms for paving streets, sidewalks and gutters, and for the uses for which porcelain and other tiles are employed, such, for example, as tiling the walls and floors of bathrooms, operating rooms in hospitals, waiting rooms and staircases of railroad stations, &c. As the Garchey stone has the chemical and physical qualities of glass it is not readily attacked by chemical products, so that it can be used in factories and laboratories where acids and other chemicals are employed, and being impervious to moisture can be used in cellars and other places where there is much humidity. The stone is also molded in ornamental forms and can be made according to the drawings of architects and interior designers for decorative purposes in drawing rooms, offices, &c. According to Consul Thackara at Havre, the Garchey bricks are not used in that vicinity in the construction of buildings, owing principally to their cost in comparison with other materials. Plain, smooth or fluted tiles 7⅞ in. square or 13 in. square and about ¾ in. thick are used for tiling the sides of kitchens, dining rooms, corridors, bathrooms, &c., as well as for flagging sidewalks, stables, passages, &c. The cost is said to be 19 cents per square foot. Highly ornamental tile 19.7 in. long by 13 in. wide cost about 64 cents each. The bricks, squares and tiles are made in various colors, such as white, green, pink, white and black, yellow, &c.

The Garchey artificial stone is said to have a capacity for resisting a pressure of 28,774 lb. per square inch, and after being immersed in refrigerating mixtures developing a temperature of 20 degrees below zero C., the stone resisted a crushing pressure of 28,845 lb. per square inch.

In Grenoble several buildings have already been provided with glass bricks, and they are beginning to find favor with the general public, so that their use is rapidly increasing with builders and contractors.

In Germany glass bricks for building purposes are being used with measureable success, and there are several concerns engaged in their manufacture. At the International Exposition of Fire Extinguishing and Fire Preventing Devices, held in Berlin, 1901, one of the concerns exhibited a small villa, the walls of which were built of glass bricks in several shades of dark green and blue, attracting much attention. Glass bricks are especially adapted to the construction of walls and buildings where light, cleanliness and neatness of appearance are especially desired. In Berlin they are made in two sizes, both 2 in. thick, 2¾ in. wide and 5 and 10 in. long, respectively. The short brick have half the length of the longer ones. The edges are made with flanges which fit into countersunk recesses, so that the bricks may be laid with very little cement into air tight and very firm although thin walls. The cost is said to be 11 cents each for the large and 9 cents each for the small size, from which prices there is, however, a large discount for quantities exceeding 1000.

In Dresden glass bricks are made for building purposes, these being of blown glass, and owing to their hollow closed form are excellent temperature and noise insulators and do not sweat or freeze. They are made in various sizes and shapes and average from 3½ to 16 cents each. They are cemented together with mortar made of 3 parts sand and 1 part Portland cement and enough white lime to render the mixture easily workable. For ventilation of glass brick buildings a special ventilator is constructed, of which a number can be readily inserted in any desirable location, as they conform exactly to the shape of the bricks.

In Hamburg glass bricks are occasionally utilized for building purposes, and in place of windows they are used to admit light in walls which, according to the police building regulations, are required to be fireproof and windowless. In addition to admitting light to dark hallways, rooms, &c., they are said to possess the same strength as ordinary clay bricks. They are also utilized in walls in yards and in partitions in the interior of houses, salesrooms, offices, workshops, &c., as well as for the construction of verandas, hot houses, kiosks, bathrooms, hospitals, ice factories, butcher shops, railroad stations, breweries, stables, and in other places where cleanliness, light and uniform temperature are particularly desired. The bricks are also made with a wire coating for fireproof walls.

In some of the recently erected buildings in Milan, Italy, bricks made of glass have been adopted for ground and upper floors on account of the light obtained. They are also coming into use for partition work in some of the hospitals on account of the hygienic principles. In one of the leading banking institutions of the city of Turin the lobby office floor which is about 36 x 58 ft. is entirely paved with glass bricks laid in iron frames for the purpose of admitting light into the basement, where are located numerous private boxes or vaults.

Plain glass building bricks, hollow and of octagonal shape, are used in the Netherlands to a limited extent. Their principal application is for light giving purposes in walls of machine shops and conservatories. The bricks are of a greenish color and transparent.

An Australian Cottage.

The picture which we present herewith relates to an Australian cottage which stands nearly in the center of a site consisting of about 4 acres, the natural Australian bush being left to a large extent. The walls of the dwelling are of a warm brown brick, while the roof is covered with split oak shingles of a silver gray color. According to the architect, E. J. Jackson, the cottage, which is located at Sydney, contains a large hall with gallery running above on three sides, the hall having an open timber roof. There are also three reception rooms, one with large ingle nook and six bedrooms.

The hall and staircase are finished in Oregon pine stained green and dull polished. The windows to all principal rooms are leaded glass, the hall window and front door with windows at the side being leaded with Venetian glass of rich coloring.

A Brick Cottage in Sydney, Australia.—E. J. Jackson, Architect.

The "Terrace" Type of Dwelling for Workingmen.

An improved type of dwelling for workingmen was described by Dr. David Sarason of Berlin in an address which he recently delivered before the Twentieth Century Club of Boston. The characteristic feature of the "Terrace System" of house construction advocated by the speaker is based on the fact that the front wall of the top floor must be posterior to the front wall of the floor below, creating on each floor a terrace which is entirely open to the air. In such a house the rooms on the first floor are largest, those on each floor decreasing in size until the top is reached. The objection of a waste of space is amply compensated for, the doctor pointed out, by the fact that every tenant has the means at hand for enjoying the fresh air by merely stepping out of his doorway.

THE new fireproof office and store building which is to be erected at the northeast corner of Broad and Market streets, Newark, N. J., will cost in the neighborhood of $350,000. It will cover a plot 43 x 67 ft. in area, will rise to a hight of 16 stories above the sidewalk, and the outside materials will be marble, terra cotta and light face brick. The plans were prepared by Architects Marvin & Davis, 1133 Broadway, Borough of Manhattan, N. Y.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS,	PRESIDENT
CHARLES KIRCHHOFF,	VICE-PRESIDENT
RICHARD R. WILLIAMS,	TREASURER
GEO. W. COPE,	SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

JUNE, 1909.

Trade Schools for Apprentices.

There is much comment at the present day regarding the need of competent mechanics in various branches of industry and the means best adapted for insuring an adequate supply for the future. The apprenticeship question is one of never ending interest, and yet, with all the discussion which it has received and is to-day receiving both in the numerous conventions and out of them, in the trade and daily press, as well as in public utterances, a satisfactory solution of the problem seems almost as far away as it was years ago. It is, however, interesting to note that there are those who are diligently working for the improvement of the young men of the country anxious to acquire a practical insight of the various branches of industry and to prepare themselves as competent mechanics in that branch which they have selected as their chosen calling in life. In the early days it was the custom for the proprietor of the establishment to work with the young men apprenticed to him and to see to it that they handled their tools properly, understood their use and care and fully comprehended the class of work upon which they were engaged. When his apprentices attained their majority he had some claim on them for an invaluable service rendered. It is only a comparatively short time, however, since employers and workmen alike had no hesitancy in speaking hastily of trade schools, manual training schools and other efforts to provide some means of offsetting the restrictions to the recruiting of skilled workmen that more sagacious men foresaw would be absolutely necessary as time went on. This school method of training young men is rapidly growing in favor, and, although the movement is not at all what it should be in view of all the circumstances, the leading men in many of the large centers have united in the support of trade schools giving both theoretical and practical instruction. When this instruction is received by young men working in different establishments they derive the benefit from the time of service and their employers are benefited far beyond the effort made to provide such instruction. During the winter many tradesmen who never before perhaps devoted any of their energies to advising a course of instruction in the principles of the work to be done or in the acquirement of the necessary handicraft, have taken up this important work and given it such attention and support that the movement will be watched with interest by all progressive citizens who recognize that in the competent and cultivated member of a community lies the future strength of the nation.

Public Schools for Training Mechanics.

In considering the question there are not wanting those who go still further and claim that the country would be more greatly benefited if the public schools, instead of devoting so much time and energy to the higher branches of education, would give more attention to the training of the pupils, particularly the boys, in some means of earning a livelihood. The early advocates of the public school were met with the statement by many taxpayers that it was an outrage that they should be called on to educate the children of other people. The public school idea has vindicated the confidence in it of those who secured its establishment. Whoever attempts to make manual training a part of the public school education, to the exclusion of the higher branches of education, must be prepared to carry an equally great burden. It is pointed out by those who favor teaching a boy something especially useful to him, that many of the boys have to go to work for their living before they have passed even the grammar school stage, and if earlier training had been to give them some instruction in carpentry, blacksmithing, or any of the other useful mechanical trades they would be better prepared to take up the work of an apprentice in any one of these indispensable vocations. It is claimed that no additional expenses would be imposed on the commonwealth if this character of instruction were made a portion of the public school educational system. It is a noticeable fact that proprietors of industrial establishments advertising in any of the large cities can secure men of good education for half the wages which any first-class journeyman mechanic will consider. This fact is regarded as a further support of the plea for paying greater attention to manual training in public school work throughout the entire country.

One Development of Better Building Construction.

The latent tendency to require high-class materials and high-class workmanship in building construction will have its corollary in impelling ventilation. Many will take issue to a claim that building work is looking upward, but will hold that the continued activity of speculative builders means that we are still to have our sieve-like dwellings and factory buildings. From the larger viewpoint, however, though of course restricted more or less to the earlier settled portions of the country, there is a leaning toward permanency of construction. Masonry bridges for railroads, carefully built edifices for churches, waterworks and sewerage plants designed to serve posterity, all bespeak the transition of the American commonwealth from the time when anything answering for shelter sufficed to the time when expediency is not the sole compelling factor, but pride and immunity from repairs and renewals. The development, slow though it may be, is progressing along with the general public education of the value of pure air both for preventing sickness and fighting it. Good building construction means tightness of wall, roof, floor and window, and where formerly the danger of living indoors without special ventilation provisions was relative, the condition is being approached when it will be a grave outlawing of nature's requirements to allow even a few individuals to remain together in the unventilated office, factory or residence. To make the matter worse in this respect, there is a generous business being done in the equipping of window sash with weather stripping. From the standpoint of economy in materially reducing heat losses, it is altogether exemplary, but it will require arrangements for ventilation where none exist. The relative difficulty of charging a vitiated atmosphere with producing ills of mankind is recognized, and it is pleasing to note the efforts of organized municipal and State departments of health to show by statistics the reduction of the so-called impure air diseases with betterment in inside air. It is pleasing to note also the interest manifested in publicity work along the line by the Society of Heating Engineers, and it is a safe assertion that the owner even of the average dwelling place will one of these days be brought face to face with the question of ventilation in providing the heating equipment, and it will be strictly up to him to decide whether or not he wants it.

Carpenters Entitled to Hang Metal Doors.

The controversy which has existed for some time past between the unions of carpenters and sheet metal workers of Greater New York as to which trade has the right to the work of hanging steel doors was decided the latter part of April by Supreme Court Justice William J. Gaynor, who was chosen umpire in the dispute. Originally the matter was left to a special committee composed of two employers and two employees, but this committee failed to agree, and it was then decided to refer the matter to Justice Gaynor for decision.

After having heard all the evidence presented to the Board of Arbitration he rendered his decision awarding the work to the carpenters. The decision is as follows:

The question presented has proved difficult to answer, but after reading all of the evidence and the papers submitted to me I come to the conclusion that the setting of the iron or steel door trim and doors, samples of which were submitted to me, does not belong to the sheet metal workers. They are thick castings and not of the kind of sheet metal which the sheet metal workers handle and to which their tools are adapted. The samples before me are so thick that they have to be cut with a saw, and no doubt such castings may be even thicker. They could not be cut with shears or bent or united or worked or soldered after the manner sheet metal is handled or fashioned. They are not contemplated by the rules which fix the domain of the sheet metal workers. The method and skill which the work requires do not belong to the craft of the sheet metal workers, but that of the carpenters. The substitution of metal for wood does not oust the carpenters. Even though the butts on which the trim and hinges are to be put are of iron or steel, the case is the same.

Roofing Materials in the Orient.

Some interesting information relative to the roofing materials used in various sections of the Orient and the Far East is embodied in reports made by consuls at various points. Replying to an inquiry as to the kinds of materials used in roofing in Turkey in Asia, Consul Thomas R. Wallace of Jerusalem writes under a late date as follows:

The old buildings are constructed entirely of stone, the walls being from 3 to 4 ft. thick, and are arched over with heavy stone ceilings. The roof is covered with stone flagging neatly fitted and cemented in the joints. The more modern buildings are constructed in a very similar manner to the above, but most of these are finished with tile roofs. The tiles are laid on a steep wooden framework. The buildings put up in this country are designed to stand several hundred years. These tile roofs are practically indestructible, the wood being the only part needing renewal. Those erected 20 years ago are still in good preservation, including the woodwork.

The tiles used here are made of a fine red pottery clay and are imported from Marseilles, France. They retail here at $4 per hundred. Each 13 of these tiles covers 1 sq. m., so that 100 tiles will cover 7 9-13 sq. m. of surface, and no boards on which to lay them are necessary, such as are required with tarred roofing. This is quite an item to be considered, as lumber in this country is very expensive.

A roofing to meet the demands here must be long lived, must stand a hot sun for seven months of the year and must be made of a material that will not injure the taste of the rain water, which is collected from the roofs in the winter months and stored in rock cut cisterns for use during the entire year. It might be that, if a market is not found in Jerusalem, where the most substantial buildings are erected, a demand might be created in Jaffa, where less durable buildings are put up, and where the rain water is not collected. Correspondence with large dealers in lumber, tile, cement, and all kinds of materials for building is recommended. They could tell if American roofing could be made to sell here.

Consul-General Thomas Sammons of Seoul reports the demand for roofing material in Korea to the following effect:

There is at present no market for rubber coated roofing in Korea, aside from what is used in a few instances by missionaries and a limited number of foreigners. Galvanized iron roofing is used to a considerable extent in government buildings and private warehouses. Thatched and tile roofs are used almost entirely by the native population.

Regarding roofing materials in China, Consul Charles Denby of Shanghai writes as follows:

At present the importation of roofing materials at Shanghai is not large, but exact figures cannot be given, as this item is not separately reported by the imperial maritime customs. It is quite probable that with the growth of the manufacturing industry in China, the erection of railroad shops and stations for lines gradually being pushed to completion, and the building of warehouses in the districts opened up by such lines there will be a greatly increased demand. A great impetus has been given to this movement within the past few years.

The Chinese use a brick tile, very cheap and quite satisfactory, for their houses. Better grades of the tile are also used extensively on foreign houses here. Tin roofs and also patent roofs are used on the warehouses, factories, railroad shops, and also on many foreign residences. Several of the American and foreign roofing companies are represented in this market. There are also concrete tile plants in operation here, doing a fair business. Direct correspondence with some of the importing houses, having head offices in Shanghai, would likely result in securing representation here.

Concerning the possibility of selling roofing materials in Japan, Consul John H. Snodgrass of Kobe, Japan, says:

The demand for foreign roofing is not sufficient to warrant any great expenditure in the attempt to introduce material from abroad. Tarred paper is becoming quite popular with Japanese builders, being used beneath the tile roofing for protection from the heavy rains that prevail here in the summer season and for the purpose of securing greater warmth in winter.

In 1907 the United States sold in this consular district tarred paper for roofing to the value of $3598, and Great Britain followed with goods worth $795. For the first 10 months of 1908 American trade in this line has amounted to $2811, while that of Great Britain increased to $1880. The customs duty on tarred felt, tarred paper, malthoid and other similar roofing and sheeting material is 2.10 yen per 100 kin ($1.05 per 132.5 lb.). All other qualities come under a 20 per cent. ad valorem clause.

Two kinds of native roofing are used—tile and natural slate, the former predominating. Tile or earthen roofing which has been adopted for the most part in Japan is quite cheap, the No. 1 quality costing 5 sen (2½ cents) per square foot; the second quality is sold at 3 sen (1½ cents), and the third grade at 2 sen (1 cent). Lately natural slate has become quite popular, being sold in strips of about a square foot for 3 or 4 sen (1½ or 2 cents). Fibro-cement roofing has also been introduced by English firms, that sell it for 14 sen (7 cents) per 16 sq in.

WHAT is probably the smallest strictly fireproof tenement house ever erected in New York City, is rapidly approaching completion in West 123d street, Borough of Manhattan. The house is six stories in hight, covers an area 25 x 72 ft. and has a façade of limestone and Roman brick. It is arranged with two suites of four rooms each to a floor and is equipped with an electric elevator.

CORRESPONDENCE.

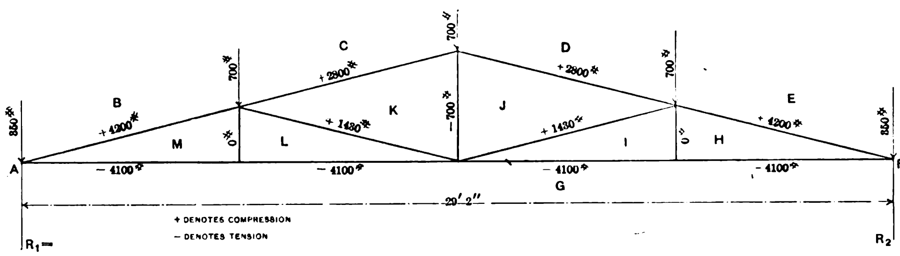
Roof Truss for an Odd Fellows' Hall.

From P. T. L., Philadelphia, Pa.—I have read with interest in the April number the article entitled "Roof Truss for Odd Fellows' Hall." In Mr. Karr's answer to the question he uses a truss with an effective span of 29 ft. 2 in. and a rise of 3 in. per foot run. After figuring it out he says the truss made of 2 x 6 in. material, as shown in the April number, is unsafe, and should be made of 4 x 6 in. material.

I have figured this truss and find that 2 x 6 in. material is just the required size, as my calculations which follow will show:

Effective span = 29 ft. 2 in.; rise 3 in. per foot run. Hight of truss at center is, therefore, 3 ft. 7¾ in.

Trusses are spaced 2 ft. on centers, and the length of slant side figures 15 ft., so one truss carries 15 ft. × 2 ft. × 2 ft. = 60 sq. ft. of roof area, and one panel point carries 7.5 ft. × 2 ft., or 15 sq ft.



Truss Diagram.—Scale, 3-16 In. to the Foot.

	Pounds per square foot.
Galvanized iron roofing	1.5
⅞-in. roofing boards	2.5
Pressure of wind perpendicular to direction of wind (using 40 lb. per square foot pressure)	13.0
Snow load	20.0
Ceiling boards and metal ceiling	4.5
Roof truss	4.5
Total load	46.0

Load at one panel point is, therefore, 15 × 46 lb. or 690 lb., say for easy calculation 700 lb.

Taking the largest stress, which occurs in members B M and E H to an amount of 4200 lb. in each, which is shown in the stress diagram, and treating the members as columns, it is found that the spruce has a safe compressive value of 412 lb. per square inch.

The following formula was used to calculate these members:

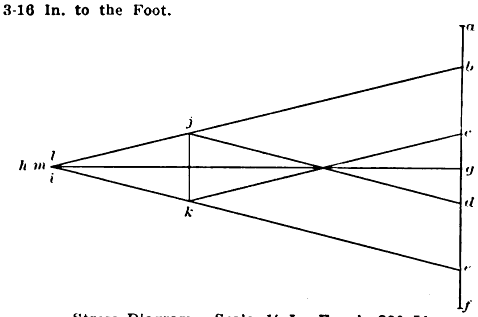
$$Se = u - \left(\frac{u \times l}{100 \times d}\right)$$

In which Se = the ultimate breaking value of the column per square inch of cross section; u = the ultimate compression value of the material of the column per square inch of cross section; l = the length of column in inches; d = the least unsupported or unbraced diameter or side of the column in inches. Length of member B M = 90 in.; u for spruce = 3000 lb. per square inch.

$$Se = 3000 - \left(\frac{3000 \times 90}{100 \times 2}\right)$$

Sc = 1650 lb. Using a factor of safety of four, the safe load per square inch $= \frac{1650}{4} = 412$ lb. Using a 2 x 6 in. spruce beam the load that can be carried with safety = 12 × 412 lb., or 4944 lb., and as there is only a stress of 4200 lb. in this member, the truss is safe if made of 2 x 6 in. members.

Referring to the load diagram presented herewith, I would state that there is no stress in members M L and I H, and it is only added expense to insert it.



Stress Diagram.—Scale, ¼ In. Equals 800 Lb.

Roof Truss for an Odd Fellows' Hall.

Construction of Stable Floor.

From F. S. B., Osterville, Mass.—I would like to know through the Correspondence columns what is the best way to build a wooden floor for a washstand in a stable. I constructed one a year ago and beveled the edges of the plank and caulked the joints with oakum, because the owner wanted it that way. Will the practical readers kindly tell me what they think of such a floor, more particularly as to its service, durability, etc.?

The Practical Value of "Carpentry and Building."

From J. E. N., Leland, Ill.—As I have been ill for some time and not able to do any manual labor to speak of, I have for pastime used the drawing board considerably. I have drawn all the examples on stairbuilding mentioned in the articles by Morris Williams. In fact, have drawn most of them several times, and have learned more from them than I ever knew before about stairbuilding. Mr. Williams handles the subject in a most thorough manner, and uses such plain language that I can readily understand him, even though I be a country wood butcher without learning. I thank him very much for the article in the May issue of *Carpentry and Building* on the "Sectorian System of Handrailing," although I must say I like his system much better and shall always use it, as it is much more scientific than most of them.

I have the "Art and Science of Stairbuilding," by L. D. Gould; the "New System of Handrailing," by An Old Stairbuilder; also the "Operative Builder," with the Sectorian System, but Mr. Williams' lessons running in current issues of *Carpentry and Building* beat them all, and more than repay the subscription price of the paper. Then, again, there are so many good articles on all points of carpentry that I consider *Carpentry and Building* the best magazine I have ever seen.

There appeared a short time ago several articles on "Elementary Perspective Drawing," by George W. Kittredge, that were very good indeed, as are also the current articles on "The Jobbing Carpenter and Some of His Work," by Edward H. Crussell. Again, Mr. Joslin handles his articles on "System in the Execution of Building Contracts" most ably, as do most of the writers contributing to the columns of the magazine. I think there is more and better correspondence from practical readers than any magazine I have yet seen, and I do not think I could get along without it, even though I did not ply my trade at carpentry, as I should want it in order

GARDENER'S COTTAGE AND CONSERVATORY ON THE ESTATE OF MRS. HENRY B. STONE, AT MILTON, MASS.

WINSLOW & BIGELOW, ARCHITECTS

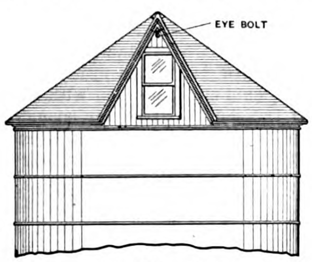
[For Floor Plans see page 201]

to see what was appearing from month to month in its columns for the benefit of its patrons.

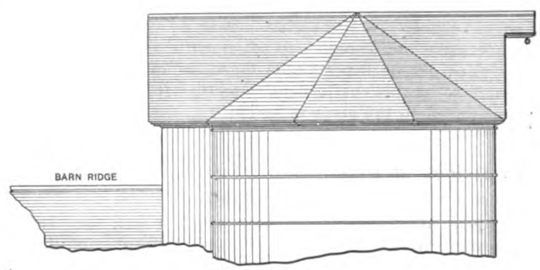
Plans of a Silo Roof.

From H. H. W., Plymouth, Conn.—I am sending sketcher of a silo roof which I erected some time ago and which has proved so satisfactory that possibly some of the readers of the paper may be interested in it. The silo is 14 ft. in diameter with 26-ft. staves, and the main roof is shingled and has a 9-in. pitch. This communication is not sent in direct answer to the inquiry of "A. D. C.," in the December number, although it may be of interest to him.

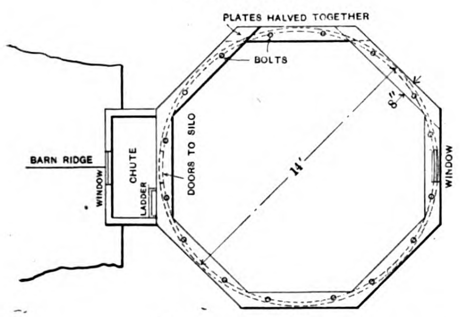
This roof was built in a more substantial manner than the average silo roof. The plates are of 2 x 8 in. stuff, halved at the corners and fastened down by means of strap bolts attached to the inside of the staves. The hip and valley rafters are 2 x 6 in. and the common and jack rafters 2 x 4 in., all framed in the usual manner. A 4 x 6 in. timber was used for the ridge in the front gable, which also projects to form a lookout, near the end of which is an eyebolt to which to hang a tackle for hoisting and holding in place the chute from the ensilage cutter. The silo is filled through the window in this gable.



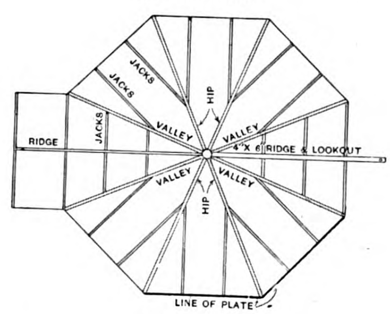
Front Elevation.



Side Elevation.



Plan at Line of Plate.



Framing Plan.

Plans of a Silo Roof.

It will be seen from an inspection of the sketches that there is a window in both front and rear gables, but these are used for ventilation and may be raised and lowered by means of cord from the barn floor. The silo is connected with the barn by a narrow inclosed alley, which also acts as a chute from which to drop the ensilage as it is taken from the different doors. There is also a stationary ladder in this alley leading from the floor to the top of silo. Its position is clearly indicated on the plan at the plate line.

Windmill for Operating Small Shop.

From P. T. L., Philadelphia, Pa.—I have been quite interested in the inquiry of "S. P. M.," Sterling, Ill., in the April issue, wherein he asks regarding the construction of a windmill sufficiently large to operate a small shop equipped with a grindstone, a small saw, a washing machine and other small machinery requiring light power. In thinking over this subject I came to the conclusion that wind force as a motive power for a shop is a very poor factor because when there is no wind the shop has no power, and when there is a wind its velocity changes constantly, thus changing the speed of the machinery to be driven, which is not desirable.

According to my idea the only way to run a shop by wind power is to install a storage battery and motor, the cost of which, including the windmill, will far exceed the cost of a small gas or gasoline engine. Either of these would be sure to give satisfaction, as it is always ready for use, because it does not depend upon changeable wind forces. A small shop as described by the correspondent in question would require at least 3 or 4 hp., and in "Kent's Mechanical Engineers' Pocket Book" I find that it would require a windmill with a 30-ft. diameter wheel with a velocity of wind of 12 miles per hour to develop from 3 to 4 hp. Therefore, a windmill would not be practical for a shop when a better power can be installed at less cost.

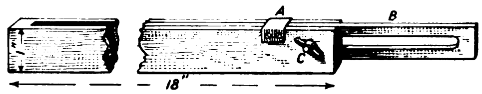
The "Carpenter's Pencil" Arraigned.

From N. J. L., Tacoma, Wash.—In the extremely interesting and practical Correspondence Department for April one of the contributors, "R. S. S.," Cleveland, Ohio, makes a very pertinent reference to what he facetiously terms a "2 x 4 pencil," meaning thereby, evidently, the large, unwieldy instrument of destruction, desperation and demoralization known to the general public as a "carpenter's pencil." The error to which he refers as having been made in stepping off the length of a rafter is only one of the many varieties of mistakes which can be directly traced to the use of such a pencil, and well serves to call attention to its unfitness for the greater part of the work to which it is applied. There may be some kinds of rough framing, such as large wet timbers, where its broad trail is necessary to catch the eye of the man behind the saw, but I think such occasions are sufficiently rare to allow it to be discarded in favor of the small round or hexagon pencils. The latter are cheap—good ones selling as low as 25 cents a dozen. They are quickly sharpened and will last long enough for any one. Their use tends to make one more careful in measuring and cutting, and carefulness begets skill, and skill commands money and respect and raises the standard of the craft. Therefore, I say, "down with the 'carpenter's pencil.'"

Avaunt and quit my sight! let the earth hide thee!
Thou thing of cedar and of paint;
With section elliptical and color rose red.
Thy wiles are countless, thy lead is hard;
Thou hast no point upon that end
Wherewith we do mark withal!

Finding Length of Molding to Fit Between Two Walls.

From R. W. M., Uniontown, Pa.—A correspondent in a recent number of *Carpentry and Building* gave his method of finding the length of a molding to fit in between two walls which reminded me of a little device I have found convenient for various measurements, and, therefore, I inclose a sketch of it. It consists of a piece of pine 1 x 1 x 18 in., with a half inch groove cut down the center, in which is fitted the strip B shown in the accompanying sketch. A slot is cut nearly the entire length of this strip, and passing through it is a bolt terminating in the thumb screw C. A strip of tin, A, is fastened across the groove to prevent the strip from getting



Finding Length of Molding to Fit Between Two Walls.

out of place. In measuring across a window sash or other place inconvenient to reach with a rule the strip is pulled out until both ends touch, when a turn of the thumb screw fastens it tightly, so that its length can be transferred to the piece to be cut.

Criticism of First Prize Design in Bungalow Competition.

From M. R., Sturgeon Bay, Wis.—I will here congratulate Mr. A. H. Fidler on the basement and floor plan of his prize bungalow, and do not hesitate to say that without a single exception it is the most up to date interior arrangement that I have ever seen.

There are a few things, however, I am at a loss to understand. For instance, the foundation section scales 8 in. in thickness and the brick are shown with alternate courses, the one showing two "headers" which goes for 8 in., but the other shows a stretcher and a quarter brick, the "stretcher" scaling 6 in.—an odd length to me for brick. Looking at the rafter ends, which are 2 x 4's, and allowing full 4 in. for depth, with the "scissor bill" affair, using the lower ¾ of it as shown, leaves 1 in. for the top "beak." Taking for granted that 12 in. is meant for the length of this (although on the section it scales 17 in.), we have pieces of wood 2 in. in width, 1 in. in depth, spaced 32 in. on centers and projecting 12 in. without any support under them to carry the roof boards and shingles or to brave the elements. Nothing has been said about dislocating the lower jaws and twisting them around so as to permit of clinching the nails that hold the roof boards in place.

The roof over the window seats looks queer to me on the plan and the elevation does not clear it up any. I shall be very glad to have Mr. Fidler express his views on these points, and trust he will take no offence at what I have said, as none whatever is intended.

Answer.—The points raised by the correspondent above were submitted to A. H. Fidler, Jamestown, N. Y., the author of the first prize design in question, who comments as follows:

With regard to the comments of "M. R.", I take the opportunity of thanking him for his kind words concerning the interior arrangement of the first prize bungalow, and also for his interest in the design as evidenced by his taking the time and trouble to write in regard to it. The section of the rear wall showing the brick foundation was not intended to be used as a working drawing so far as the exact placing of each brick was concerned. The marking off of the bricks was only intended to represent brick work, and not to be used as a copy by which to lay the brick.

In regard to the rafter ends being left so that they are without support to carry the roof boards, shingles, etc., I would say that according to my idea they will find plenty of support at this point for such weight as may develop. By actual measurement to scale the rafter end in question does measure 17 in. when 14 in. was intended. A detail 1½ in. to the foot should have been drawn of the "scissor bill" the same as was drawn of the pergola timber, for the ends of the rafters shown on the elevations were not intended to be used as working drawings, as it is impossible to do justice to details drawn to a ¼-in. scale. The roof boards that cover the "scissor bill" are to be nailed to the rafters with wire nails driven in slanting, so that clinching is unnecessary. In this way the under face of the beak will not be marred by having clinched nails show.

As the Wisconsin correspondent fails to make clear to me just what he does not understand in regard to the roof over the window seat, I would suggest that he write more specifically, and I will be very glad to endeavor to make all clear to him.

Details of Painter's Scaffold.

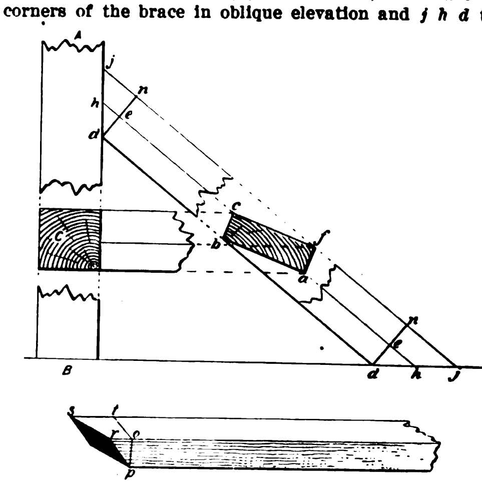
From L. G., Los Angeles, Cal.—In looking over the sketch accompanying the description of the unique painter's scaffold which was furnished by I. G. Bayley, Cape Point, N. J., for the April number of *Carpentry and Building*, I note an important feature which was probably inadvertently omitted in preparing the drawings. No provision is shown for preventing the lower end of the small ladder "A" from slipping from its place of support on the board "E" when in use. The lower end of this ladder should either be shod with sharp spikes or the sides "D D" should extend far enough above "E" to keep the foot of the ladder where it belongs, or, better still, it would be the part of wisdom to take both precautions.

Problems in Roof Framing and Bracing.

From J. C. M., St. Johns, Newfoundland.—In answer to the request of "J. F. W." of Austin, Texas, in the February issue, I would refer him to pages 358 and 359 of *Carpentry and Building* for November, 1907; pages 337 and 338 of the October issue, 1908; page 26 of the January issue, 1909; also page 98 of the March issue, 1909, in all of which he will find answers to his first question.

In reply to his second query regarding the bracing of a post, I suggest the following:

Referring to the accompanying sketches, A B represents the post to be braced, of which C is a section, and *a b c f* a section of the brace standing at any angle to the post. Draw the lines *f j*, *c h* and *b d*, which are the corners of the brace in oblique elevation and *j h d* the

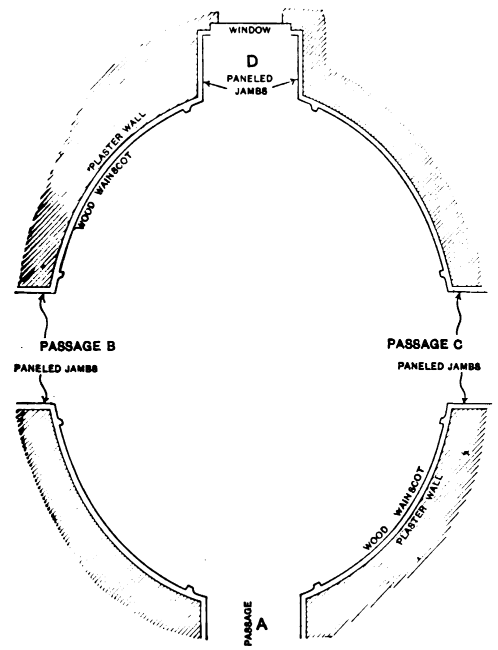


Problems in Roof Framing and Bracing.

points where these corners intersect the post. By drawing *d n* at right angles to *d b* we find that the corner *c* is longer that the corner *b* by the length of the line *e h*, and that the corner *f* is longer that the corner *b* by the length of the line *n j*. Therefore, if we draw a line around the brace square with each edge as *t o p* in the lower part of the sketches and lay off *t s* and *o r* equal to *n j* and *e h* of the upper part of the figure, we have on connecting the points *s r p* the bevel line of the end of the brace as required.

Wainscoting an Oval Room.

From G. H. G., Philadelphia, Pa.—Once more I come to the Correspondence columns for information regarding a problem which now confronts me. I inclose a rough sketch of a room, oval in plan, which is to be fitted with a low wainscoting about 3½ ft. high. Openings marked



Wainscoting an Oval Room.

A, B, C and D are paneled, with paneled jambs outside and a 6-in. trim on the room side. No measurements are given because they are not known, and I should like to ascertain the best way to go about measuring such a room and making the templates for the curved portions, as the wainscot is to follow the contour of the walls. The idea is to put the work together at the shop after the fashion of fine cabinet work and then put it up at the building. It must go into place as accurately as possible.

This is a proposition I shall soon have to seriously consider, and as I have gained considerable assistance from the columns of *Carpentry and Building* in the past I come to the readers again to help me out.

I would say that the passage or opening A must center with D and the passage C with passage B after the finish is up. The approximate dimensions are about 20 ft. on the major axis and about 15 ft. on the minor axis.

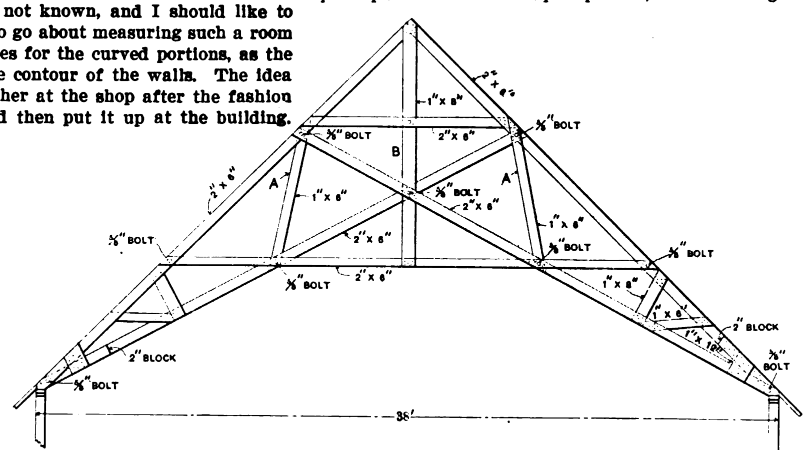
Is the Church Roof Truss Safe.

From C. L., Little River, Kan.—I am sending a sketch showing an elevation of a church truss which I should like very much indeed to have the practical readers criticise. I wish to know if the construction shown is safe.

The trusses are to support a shingle roof and a light wood ceiling and are spaced 24 in. on centers.

Answer.—We have reproduced the drawing of the roof truss submitted by the correspondent above, and in reply would say that it is sufficiently safe, as indicated by the span and the spacing of the truss, but there is room for improvement in the manner of construction. As shown, the alignment of the stress is one-sided, and there is too much of a transverse strain on the nailing.

If the two nearly vertical struts marked A A were built of two 1 x 3 in. pieces instead of one 1 x 6 in. piece, and if the center tie piece marked B were to be built of two 1 x 4 in. pieces instead of the 1 x 8 in. piece as indicated, the construction would be as strong and rigid as required, and the line of stress would be better centralized. The vertical pieces should inclose the top and bottom chords and, therefore, be separated by a space of 2 in. C. K. P.



Is the Church Roof Truss Safe?—Reproduction of Sketch of "C. L."

Problems in Roof Framing and Bracing.

From L. H. Hand, Bloomfield, Ind.—Assuming that in connection with the inquiry of "J. F. W.," in the February issue of the paper, the hip rafter is backed so that sheathing will fit on both angles, the main building being 18 ft. with square pitch, makes the common rafter 9 ft. + 45 in., or 12 ft. 9 in. in length. Take these distances on the blade of the steel square and 12 ft., which is half the width of the other building, on the tongue. This applied to the ridge line on the backing of the principal rafter will give the top cut for the side next to the ridge board on the 18-ft building. The common rafter on the 24-ft. building will be 9 ft. rise to 12 ft. run, making the common rafter exactly 15 ft. in length. Take 15 in. on the blade of the square and 9 in. on the tongue, which represents the common rafter on the wide building and half the width of the narrow building. This applied to the ridge line on top of the principal rafter gives the top cut next to the ridge on the wide building. The base of the principal rafter being 9 x 12 ft. makes this base line exactly 15 ft. in length; hence the rise of the roof being 9 ft. the figures 9 and 15 on the square gives the side cut.

This is for equal pitches. The length of the rafter on the blade and half the width of the building on the tongue of the square gives the top cut on the back of any principal rafter. In unequal pitches, take the length of the rafter for one building and half the width of the other building and the result is the cut on the backing of the principal rafter for the side on which the rafter goes.

The plan shown in Fig. 2 of the correspondent's sketches seems to show the brace running square from the face of the post and could be cut with 12½ in. by 18 in. on the square. I am, however, inclined to the opinion that the correspondent has not stated his question just exactly as he intended, in which case the 12½ and 18 would not be a correct solution of his problem.

Again, I do not think question three is clearly stated, but presume the correspondent refers to the intersection of a half pitch gable plancier with a projecting eave cornice, which is returned around the building and then returns, shingled at one-third pitch. Supposing the old style one-third, or 8 x 12, the plancier would be 8 x 8 on the steel square, or 11 4-12 in longer at the point than at the back for every foot in pitch; hence 11 4-12 in. and 12 in. on the steel square would cut the plancier to fit against the said projecting one-third pitch.

Trouble with a Copper Skylight.

From B. & M., Concord, N. H.—We have had a good deal of trouble with a copper skylight and roof which we have placed over a small hospital operating room. The trouble is caused by leakage or other difficulty. The peculiar part of this work is that in summer, no matter how hard the storm is, the roof never leaks, but as soon as ice commences to form on the roof leakage begins. We will positively say that there are no holes in the metal work, as we took extra pains to do a first-class job. We will further say that we have told the owners of the hospital that the apparent leakage was condensation. They scoff at this idea and keep demanding us to make the roofing tight. Inclosed is a sketch which gives the plan and elevation of the roof and room.

Answer.—The communication and sketch of our correspondent were submitted to a practical roofer, who furnishes the following suggestions, it being considered unnecessary to reproduce the sketch in this connection:

From the information given it is fair to assume that condensation is the cause of the trouble, but the question could be decided with more certainty if it were known where the water drips, and if it ever gets in when the roof is dry. If the skylight is properly constructed and has sufficient pitch there should be no trouble from condensation in this part of the work, as the proper construction of a sheet metal skylight provides for carrying off the condensation. The section seems to show sufficient pitch to the skylight to carry the condensation to the bottom gutter, unless it is glazed with the "maze" or some other pattern of figured glass with figure on the under side. This might prevent the drops of sweat from following the glass to the bottom edge and passing out. Another chance for trouble is at the upper edge of the skylight, which seems quite low, and it is possible that the snow and ice at that point sometimes cause capillary attraction to draw the water inside. This would account for the trouble in the winter when it does not cause any trouble in summer.

The owners will probably contend that if condensation is responsible the water should drop all the time in cold weather. The answer to this is that the condensation would be more likely to show during a storm, because the air at that time is more heavily saturated with moisture, and, therefore, more likely to cause condensation. It should, however, be an easy matter to show whether the trouble is caused by condensation or not. A test could be made on a cold day when the roof is entirely free from ice and snow. This being shown to the satisfaction of the owners, and the room being at the normal temperature, the air could be thoroughly saturated by boiling a tank of water over several large fire pots or by introducing steam from some of the sterilizing apparatus or the radiator. As much should be introduced as the air will carry, and if this is kept up for half an hour or an hour it should demonstrate that condensation could or could not cause the trouble. If the "leaks" are then in evidence, the proof is there that condensation could cause the trouble. If the "leaks" should not show, then it is "up to" the roofers.

They should be careful to see that no ventilators are open when the test is carried on, unless these were open at other times when complaint was made. It is understood, of course, that the test should be made under the same conditions as existed when complaint was made, except that the roof should be free from snow and ice.

It is more than likely that an investigation will show that this trouble usually occurs during or following the extended use of the room for an operation or the sterilization of the apparatus.

The writer knows of two very large skylights about which complaint was made of leakage some months ago. An examination showed several small spots on the floor where the water was dripping just fast enough to keep a wet spot on the floor about as large as a man's hand. Further examination showed the roof above and below the skylights dry and free from ice and snow, and also showed small streams running from the weep holes at the bottom of the skylights, showing that a large amount of moisture was being collected and carried out, and proving that the trouble was caused by a few cross joints in the skylight having been improperly made and failing to conduct the condensation into the main gutters. Although the day was very cold and the air inside very moist (a number of leaks in the steam heating pipes actually saturating the air), opening the dampers in the ventilators stopped the trouble entirely. This is given as an illustration to show how important it is to see that the test should be conducted under the same conditions as exist when the complaints are made.

Design Wanted for Carpenter's Tool Case.

From H. W. R., Trenton, N. J.—I would like to ask some of my brother carpenters to furnish a design of a carpenter's tool box in the style of a dress suit case. The length should be 28 in., the width 8 in. and the hight 17 in. I have been a reader of *Carpentry and Building* for about three years and could not do without it.

Note.—If our correspondent will refer to the June issue of *Carpentry and Building* for last year he will find under the heading, "Carpenter's Portable Tool Case," a description of a tool chest resembling somewhat in appearance a dress suit case. The dimensions outside are 31 x 14 x 6 and the case has a removable tray 30 x 4½ x 1 in. While the dimensions are not exactly those called for by our correspondent, they so closely approximate them as to probably meet his requirements.

Some Questions in Brick Wall Construction.

From T. K., Cazenovia, Wis.—Will some of the practical readers of the paper furnish full information through the columns of the Correspondence Department on the following questions:

How thick should be the walls of a brick building 32 ft. square and 20 ft. high?

What is the best way to fasten the second story joists to the outside walls?

What is the best way to fasten outside trim to brick walls, such as porches, cornice, casing, &c.?

What is the best way to fasten inside baseboards to brick walls?

If the practical readers will throw light upon these points they will be doing me a great favor and possibly be furnishing information of interest to others as well.

Action of Frost on Concrete Wall.

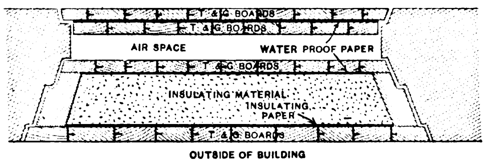
From H. L. E., Newport, Maine.—I find in the May issue of *Carpentry and Building* some comments on concrete construction by L. H. Hand. I am greatly taken with the idea as illustrated and described, but would like to ask in regard to the action of frost on a wall so built when the land is of a clay loam. Would a wall without batter stand all right? The grout walls built here are all battered, and as Mr. Hand says the "forms" are the cause of many poor looking jobs as well as a great deal of expense, I would like to have him or some readers of the Correspondence Department express an opinion on this phase of the subject,

Effect of Weather on Paint Mixed with Spar Varnish.

From C. E. W., Columbus, Ohio.—What would likely be the effect of the elements upon paint composed of good lead and oil if 1 gal. of spar varnish was used to every 100 lb. of lead?

Construction of Walls for Cold Storage Room.

From C. J. W., Norfolk, Va.—In regard to insulation of the walls of a cold storage room, as mentioned in the letter of "H. J. H.," Missoula, Mont., in the April issue, it is to be borne in mind that "dead air" is the best possible insulation, and all methods of insulation seek to attain this. If the air spaces are large this cannot be done, for by "dead air" is meant "still air"—not air that is vitiated or injurious to life. Now, if the air spaces are large, it is an impossibility to keep the air



Construction of Walls for Cold Storage Room.—Horizontal Section Through Ice Chamber Doors.

still, consequently the best and latest practice is to reduce these air spaces to the smallest possible dimensions. Dry sawdust is very good for this purpose, but is objectionable on account of vermin; also granulated cork and mineral wool are each very good, so that a choice is offered from which selection may be made.

The studding should be set up; then the side next to the cold storage room should be covered with a good heavy waterproof paper, lapping all joints liberally. Over this paper the correspondent should nail matched sheathing, and after this has been done nail lath over all joints of the paper that show between studs. These lath should be cut neatly between studding to leave as little chance for air to enter as possible.

Now commence to pack between the studs with whatever insulating material it has been decided to use. The outside should be sheathed with matched stuff carrying the sheathing and insulating material up together. After this is completed cover the outside sheathing with some good waterproof insulating felt, then add the weatherboards, shingles or whatever the outside covering is to be.

The inside of the room may be covered with zinc or galvanized iron, or may even be left with the bare wood, according to preference and judgment.

The construction of the doors for an ice chamber should be in accordance with the sketch which I send herewith, and which represents a horizontal section through the door and jambs. It will be noticed that there are two doors, one inside and the other outside, but each door should be made to swing independent of the other. According to the drawing, the inside door swings inward to the ice chamber, but if space and construction will not permit this, change the rebates and swing it outward. If this is done make the outside door a little wider than would otherwise be necessary.

The better the joints fit and the more thoroughly the entire work is done, the better will be the results in regard to the quantity of ice used.

As to that portion of the correspondent's letter relating to a secret drawer or receptacle in the dining room for silver, permit me to suggest to him that he put on his thinking cap and work out the problem himself. If he will but consider the matter for a short time I am quite sure he will be able to work it out to his entire satisfaction and much better than could be done by an outsider who is not altogether familiar with all of the local conditions and features which necessarily enter into a problem of this kind; then if he will sit down and tell the readers of *Carpentry and Building* how he accomplished it he will have a most interested audience.

It is all very well for the older and more experienced members of the craft to give the younger men occasional help to do their own thinking, but I am quite sure the latter will feel much better satisfied in the end if they will seriously ponder some of the questions which naturally arise in connection with their daily work, and which will be found of comparatively easy solution if they give them a little careful thought. This would altogether avoid the necessity of asking others to think out all the petty details for them.

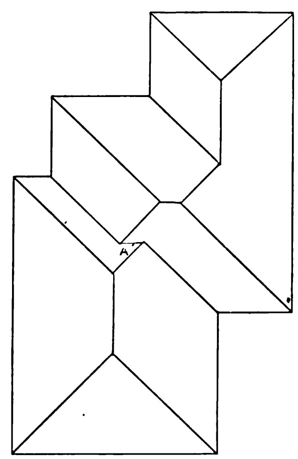
With all this said, however, it must not be inferred that I am discouraging questions for the Correspondence Department—quite the contrary. This department of the paper is of the most vital importance to every mechanic connected with the building industry, as it affords excellent opportunity for the interchange of ideas between practical men all over the country. My only point is to impress upon every young man the necessity of seriously pondering his problem in all its different phases before he decides to call upon his fellow craftsmen for assistance. The old adage "Knowledge easily acquired is not worth much" applies with equal force in the carpentry trade.

Tin Not to Be Laid on Felt Roof.

From Bert McKibben, Augusta, Ky.—In regard to the matter of putting tin over an old felt roof, concerning which there has been some comment in the past, will say that under no conditions should this be done, and if done one to three years will end the life of the tin roof thus put on. Not only should the old roof be torn off clear down to the sheathing, but at least two thicknesses of heavy resin sized paper should be laid on the sheathing and the tin painted underneath with one heavy coat of Venetian red and oil, as the sheathing boards will be found to have absorbed quite a quantity of the "prepared paint" put on the felt roof and which, as a matter of course, is very destructive to metal roofs. I have had a great deal of experience along this line, and am positive that my argument on this question cannot be successfully gainsaid.

Roof Plan for Dwelling House.

From R. H. C., San Antonio, Texas.—The plan of roof which I send is in response to the request of "G. W. G.," in the May issue of the paper. I would say that at



Roof Plan for Dwelling House.—Contributed by "R. H. C."

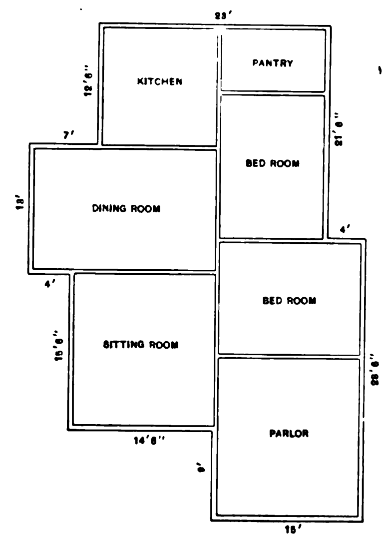
the point "A" is a small valley which divides one side of the roof from the other. The plan so clearly indicates what is intended that extended comment does not appear necessary.

Building Stairs with a Continuous Handrailing.

From S. P. M., Sterling, Ill.—Permit me to inquire of the stairbuilding experts if the method of building stairs with a continuous handrail, as described in the articles by Morris Williams, is practiced to any extent at the present day. Stairs are not built that way out here or anywhere else that I have ever been. In my opinion this form of construction is out of date. Any carpenter who knows how much twice two are can build stairs where landing newels are used, and that is the way they are built in all parts of the country.

Roof Plan Wanted for Dwelling.

From W. V. W., Scottsburg, Ind.—I would take it as a favor if some reader of your valuable paper would furnish for publication a working sketch of a roof design that would best become the floor plan inclosed herewith.



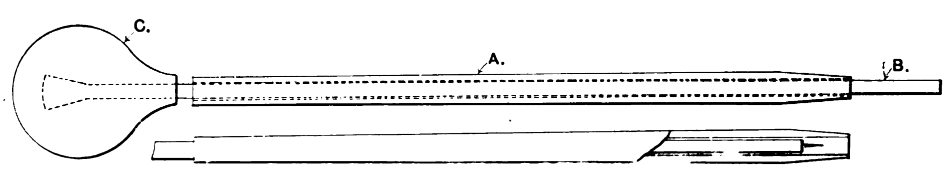
Roof Plan Wanted for Dwelling.

I have been a constant reader of *Carpentry and Building* for four years, and have seen some very complicated roof designs. The one in question gave me some trouble this summer, and I had to change the house before I could roof it.

Convenient Tool for Pattern and Cabinet Makers.

From B. M. D., Cincinnati, Ohio.—I am sending herewith a blue print illustrating a neat little tool for pattern makers, cabinet makers, &c., which is especially convenient for driving very short tacks or starting small screws in almost inaccessible places. The tool is made up of three parts, A being a brass tube, B, tool steel or plunger, while C is the knob or head which can be made of any available metal, preferably lead, Babbitt, brass, &c., which can be easily molded. The tube A can be made of any desired length and diameter, and its bore should be just large enough to allow the rod or plunger B to slip in it easily. The rod or plunger B should be made of tool steel with the striking end hardened and of sufficient length to allow about 1 in. to project beyond the tube A. The other end of the rod B can be nicked or flattened so that when metal is poured around it for the knob there will be no danger of the rod pulling loose from the knob. The plunger B should be magnetized, which can readily be done by any person having access to a dynamo.

The upper part of the sketch shows the tool assembled, while the lower sketch indicates its method of operation. In using the tool it is simply necessary to pick up a small tack with the magnetized plunger B, draw it back into the tube A, place the tube in the desired position and drive the tack, as the knob C has sufficient weight to very readily send home a good-sized tack or brad.



Convenient Tool for Pattern and Cabinet Makers.

A Significant Element in Carpentry.

From E. S. Crull, St. Louis, Mo.—It has been remarked that the foreign craftsman who has been trained under a long period of strict apprenticeship brings with him to this country infinite patience, skill and the thoroughness that is significantly lacking in our "get-through-quick" manner, and that he is fitted for the exactness demanded of the cabinet maker.

To our methods and the opportunities afforded, more than to the temperament of our workmen, perhaps, may be attributed the fault that is obviously increasing. Since the old-time apprenticeship service is no longer possible or desirable, or, indeed, a necessary requirement to employment, one does not "learn a trade," but "takes it up," with scarcely a distinguishing scale of wage earnings from that of a more skillful and capable workman. This is the class that is frequently, yet seldom unjustly, referred to as "wood butcher" or the "saw and hatchet" carpenter. The class is increasing faster than the restricted opportunities of apprenticeship would seem to justify or the trade schools can rectify. If thorough knowledge and training are no longer essential to due recognition, it is mostly certain that the time it is necessary to devote to gain it will not be accorded.

As examples of lacking skill and training combined with the makeshift practices in vogue in evidence the country over, the writer desires to make mention of one that is in general application and that, seeming insignificant, is the more readily and constantly "slurred" or botched in utter disregard of true mechanical construction.

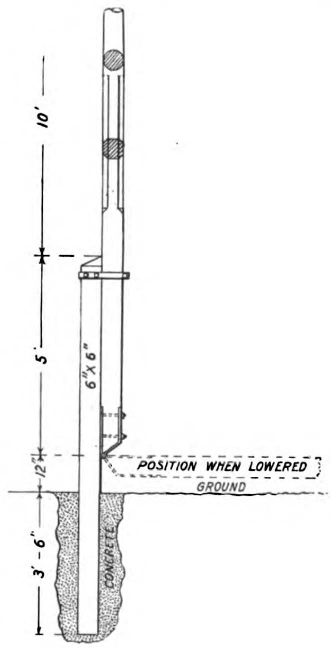
Recently there was observed a "clear, edge grained" yellow pine floor that was shamelessly ruined in appearance directly after the laying, wholly due to the unworkmanlike and wrongful manner of laying the primary floor of 12-in. common boards, over which was longitudinally nailed the narrow floor, the object, of course, being economy in time, as the saving in material was scarcely to be considered. The shrink of the 12-in. boards caused gaps to appear in the finished floor of nearly half an inch over every joint below.

With questionable notions of economy, largely gathered through competitive contract methods, popularly in favor at this time, it is the common practice to place wall sheathing, designed for warmth and strength solely, in a horizontal position squarely crossing the studs, on which the siding is then nailed longitudinally.

The sheathing may be one of any of the various sorts in use, and of selected widths, 6 to 12 in., or random, though the latter is less in demand, and may be shiplap, D. & M., or square edge. The wider and more common material the more there is tendency to shrink, and if the lumber be not wholly dry the shrink may be considerable; as much as ½ in. is not unusual in the 10 and 12 in. widths when nearly green and sappy, no matter if nailed tight and close. There is nothing but the lap to prevent the separation of the siding over such shrinking joints, and if nailed, as so often, through the lap, so that there can be no slip at the lap, a split is certain.

Observing the display of cracks and splits in siding on buildings, as one must who is in the least interested in construction and material, one is reminded of the experiences of a most thorough and competent contracting carpenter who said that in nearly 50 years of active contract work, in which he had employed great numbers of men, it had always been hardest for him to induce the workmen to omit the last blow of the hammer in nailing on siding and shingles; that the last blow was the one that caused the nail splits, as it was the proverbial last straw that strained the camel's back.

It is probable that no principle of building construction is more freely and indulgently disregarded than the position that wall sheathing should take to the siding that cover it. The occasion would be one of rare ignorance that would build veneer with the layers and core grains longitudinal, or that would lay shingles the same way of the sheathing beneath, or even a floor as has been here described. Siding laps may be deemed as of the same purpose as shingle laps and should not be permitted to suffer disturbance.



Raising Heavy Martin Boxes and Poles.—Fig. 1.—Plan Suggested by "M. D. S."

The writer has frequently discussed this matter with carpenters, architects and contractors in various localities. The only opposition at any time advanced to placing wall sheathing in position diagonally (the only way it should ever be placed if to be covered with siding), is that "it takes more time to fit and nail," though it is never denied that it adds much to the strength and stability, and is the correct principle in construction.

Good architecture may be perceptibly baffled by unfaithful or incapable achievement of design, and obvious omissions in architectural specifications may be consistently redeemed by the mechanic who conscientiously adheres to his precepts of thoroughness in his interpretation, in spite of possible advantageous loopholes.

Rendering Concrete Waterproof.

From J. L. S., Clayton, Del.—A porch is to be built over a sidewalk in front of a store so that the tenants on the second floor may have a place to sit evenings. There is to be a concrete floor used on top of 3 x 8 in. joists placed 16 in. on centers, with a rough wooden floor laid between them on top of cleats nailed so as to give ½ in. fall to over 2 ft. run.

I would like to know the method of making concrete water tight, also if 3 in. will be sufficiently thick for the concrete. I shall be glad to have readers replying to this inquiry give all the information or suggestions which they can with a view to making a first-class job.

Raising Heavy Martin Boxes and Poles.

From M. D. S., Pittsburgh, Pa.—In the March number of the paper I noticed a request from "R. W. M.," Uniontown, Pa., for a method of hinging poles for Martin boxes, so that they may be raised and lowered at will, also a method of raising the poles and box.

In the issue of *Carpentry and Building* for April, 1896, page 82, is an article on methods of constructing flagstaffs contributed by me, which may help "R. W. M." out of his difficulty. The originals of the two sketches there shown are still standing and in use—the one after 17 years and the other after 14 years. The details in Fig. 2 explain themselves.

The requirements being different in the case of "R. W. M.," he can modify the details. The stanchion ought to be of hard oak, cedar or locust, 6 x 6 in., and extending at least 6 ft. above the surface of the ground. The bottom part of the pole should be the same size as the stanchion for a distance of 6 ft. The irons can also be modified accordingly; the hinge of ¼ x 6 in. iron, and both clamps of ⅜ x 1½ in. iron, all bolts being ⅝ in. A good idea of my plan is shown herewith in Fig. 1.

As to a method for raising the pole and box after being hinged in this manner, I would suggest that if there be no tree of sufficient strength or a building of any size near the location of the pole to which to hitch, he can use a tripod 9 or 10 ft. high. Use ⅝ in. rope and a set of blocks—one single and one double. If a hitch can be obtained, say 8 ft. above the hinge, I think "R. W. M." will have no trouble in raising the pole with his 200-lb. Martin box on top of it.

From J. L., Canton, Mass.—In reply to the inquiry of "R. W. M." in the March issue as to an easy method of lowering and raising bird houses, would say that I have a flagpole 30 ft. long which two men can raise and lower without any trouble, and which has been in use about 20 years. I have never seen anything like it, and I think the same method could be applied in the case of the bird houses of the correspondent named.

Take a good stout post, put it down in the ground about 4 ft., leaving about 2 ft. above the ground. Cut out about 2 in. from the side of the post and cut a pole so as to fit the square face of the post. Then bore two holes and secure with ⅞-in. bolts as indicated at A and B in Fig. 2 of the accompanying sketches. When it is desired to lower the pole, remove the bottom bolt and loosen the upper one, and the pole will swing on the upper bolt as a pivot, as indicated in the left hand sketch.

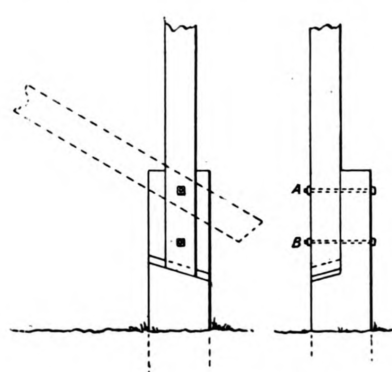


Fig. 2.—Method Recommended by "J. L."

If "R. W. M." thinks this idea is practical in his case and yet does not fully understand the explanation here presented, I will endeavor to make the matter more clear if he will indicate his needs through the columns of the paper.

Conical Roof for Concrete Reservoir.

From P. T. L., Philadelphia, Pa.—In the April issue of the paper, page 137, "J. B.," Rockland, Mich., asks for a plan of a conical roof for a concrete reservoir 60 ft. in diameter, 8 ft. deep with 12-in. concrete floor and 24-in. walls. I inclose sketches in answer to this request, which I trust will interest the correspondent. He also stated that he should hardly think it necessary to figure snow pressure, but in Michigan, where the snowstorms are severe at times, I should think it was very necessary to figure on a pressure at least of 12 lb. per square foot. Even if the snow pressure was eliminated the truss members could not be made much lighter than 4 x 4 in. yellow pine on account of the restriction in column formulas which gives a limit in the relation of 10 to 45; that is, the length of the column should be more than 10 times its least side and less than 45 times that side.

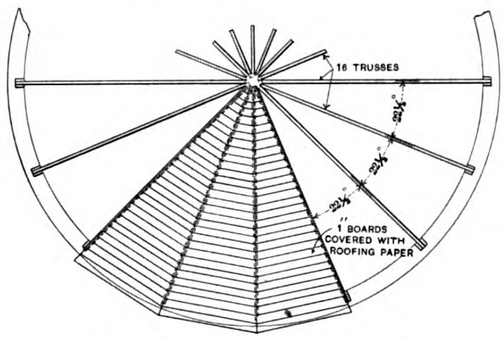


Fig. 1.—Partial Framing Plan of Roof.

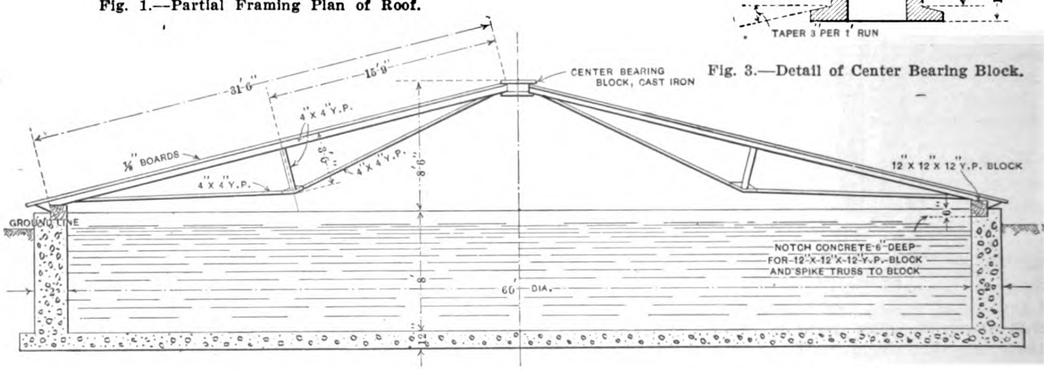


Fig. 2.—Sectional Elevation of Reservoir and Roof, Showing Truss Arrangement.

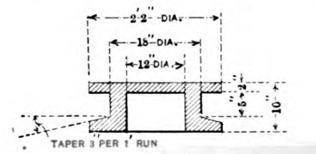


Fig. 3.—Detail of Center Bearing Block.

Conical Roof for Concrete Reservoir.

The length of the compression member in the truss is 189 in., and a 4 x 4 in. member will just about answer the purpose.

The roof is composed of 16 light trusses covered on top with 1-in. yellow pine or hemlock boards and roofing paper. The ends of the trusses at the wall are to be spiked to 12-in. cubical blocks, and the ends at the apex of the roof are to rest on a cast iron cap or bearing block, a detail of which is given among the sketches.

Fig. 1 represents a plan view of the roof showing the framing construction drawn to a scale of 3-64 in. to the foot. Fig. 2 represents a sectional elevation through the reservoir and roof, while Fig. 3 is an enlarged view of the center cast iron bearing block.

In regard to the reservoir roof I would state that wrought iron rods ¾ in. in diameter can be used if desired in place of 4 x 4 in. yellow pine in the two lower tension members of the truss. There is an end thrust exerted by the truss against the concrete wall, but if the concrete is notched as shown its shearing strength will take care of the thrust.

Fig. 4 represents the load diagram and Fig. 5 the stress diagram. In Fig. 4 the plus marks denote compression and the minus marks tension.

The calculations for the reservoir roof are as follows:

Diameter of reservoir equals 60 ft., and the diameter of the roof 64 ft. Area of roof of 64 ft. diameter equals 3217 sq. ft.

	Pounds per square foot.
Snow load	12
Truss	3
Wind load, using 40 lb. per square foot	12
1-in. boarding and roofing paper	5
Total load	32

Multiplying the square feet of roof area by 32, the total load per square foot, gives 102,944 lb. as the total load in the roof.

As we use 16 trusses we divide 102,944 by 16, which gives 6434 lb. as the load each truss will be called upon to carry, or say 6500 lb.

Referring now to the load diagram, Fig. 4, the member B G has to resist a compressive stress of 7400 lb., and using the column formula we have

$$S\,e = w - \left(\frac{w \times l}{100 \times d}\right).$$

$w = 4400$ lb. per square inch for yellow pine.

$$S\,e = 4400 - \left(\frac{4400 \times 189}{100 \times 4.} = 2080 \text{ lb.}\right) = 2320$$

and using a factor of 4, the safe load per square inch equals 580 lb.

Now 580 lb. multiplied by 16, the number of square inches, gives 9280 lb. as the safe load that a 4 x 4 in. yellow pine member can support.

As we require a 4 x 4 in. yellow pine member we have for the sake of uniformity used the same size throughout the truss.

Design Wanted for Doctor's Residence and Sanitarium.

From R. P., Freeport, N. Y.—I come to the Correspondence columns for suggestions as to planning a doctor's residence which is also to be used as a sanitarium. It is to be about 30 x 40 ft. in area and in the basement there is to be a dining room, kitchen, laundry, bath, &c.; on the first floor a parlor, sitting, reception and operating rooms and office; on the second floor six or seven rooms for patients, and in the attic about four rooms for the family and help. It is to be a frame building, with stucco exterior and red tile roof, and is to be built on a clear, sandy location.

I would like particularly to know if it would be practical to place a bathroom and laundry in the basement, the sewer being only 4 ft. below grade. A piazza is to be built across the front and around both sides of the house, so that the basement would have to be extended out in order to give light to the kitchen and dining room.

Reunion of "X. Y. Z.'s" Friends Suggested.

From T. D. G., Council Bluffs, Iowa.—I desire to say that "X. Y. Z.'s" greeting to old friends in the April issue is interesting to me, as I have my credentials in the shape of 30 volumes of *Carpentry and Building*, which I prize and appreciate the same as "A. B. C." of Yarmouth, Nova Scotia. I subscribed about the time he did and then sent for the back volumes.

I would suggest that the Editor assist us in a general round-up about August (watermelon time), and I think Springfield, Ill., a central location. It will be remembered that "W. B." of Springfield, Mass., gave a house-warming to the boys about Christmas, 1880, but being only an apprentice then I did not attend. I surely could meet our friend "X. Y. Z." this summer and bring some of the grandchildren. Come, boys, and look out for an account of our reunion in the September issue.

Note.—The columns are open for a discussion of the subject, and all the veterans are especially invited to participate.

Softening a Grindstone.

From H. C. W., Dillsboro, Ind.—Will some reader of the Correspondence Department of the paper tell me of a method of softening a grindstone, so it will wear away and obviate the difficulty resulting from the pores filling up with particles of steel. The latter cause it to become so smooth that it does not cut fast enough to do good work. The one I have is what is known as "Berea" stone.

I greatly appreciate *Carpentry and Building* and consider it a "top notcher" in the line of architectural publications.

Rule for Painting Outside Doors.

From J. E. R., Virginia.—Will some of the practical readers of the Correspondence columns give me a suggestion as to a rule for painting outside doors so they will harmonize with the body or trim of the house. The walls and roof of the house are covered with shingles, dipped natural color, and the exterior trim is white. Any information on the subject will be greatly appreciated.

Design Wanted for Outdoor Bake Oven.

From P. R., Freeport, L. I.—Will some of the practical readers of *Carpentry and Building* tell me the best way to build an outdoor oven for baking bread.

Architects Criticised by Millman.

From R. A. W., Woodlyn, Pa.—I was much interested in the criticism published in the April issue relating to the article in the December number entitled "Architects Criticised by a Millman." I presume the person favoring us with his criticism is a competent architect and speaks to defend his professional brethren. In one place in his criticsm he says: "The employment of a competent architect is to escape the nightmares and monstrosities usually embodied in the stock pattern moldings, sash, &c., as they are misconceived at the hands of the millman." The critic probably forgets that these "nightmares and monstrosities" were in the first place designed by "competent architects," and not by the millman. The latter has not, perhaps, the highly developed artistic eye common to the architect, but he can originate some very common sense and artistic designs.

If many of the so-called or self-styled architects would give more attention to the stock patterns in the various mills, study their outlines and honestly endeavor to blend and harmonize them with the special or distinctive style of the building and vary the designs a little instead of trying to create a distinctive style or order of their own, I am sure the architect, millman and the carpenter would get along more smoothly.

I wish the critic and his professional brethren to understand that I am not prejudiced against architects—far from it—but when some of these men who do not know the first thing about a building, except what they have learned from books, draw plans and make blue prints and insert things that are really impossible to carry out in actual construction, it is not much wonder the builder gets out of patience. Some fantastic moldings which particularly appeal to his artistic eye and other incongruities which are simply ridiculous make him the laughing stock of the carpenters and contractors. The architect's book knowledge is very often placed against the practical knowledge of the mechanic, gained by many years of actual experience. True, this is the case in all trades—too much theory and too little practice. The best architects are those who have a plentiful supply of both, and good common sense to use it. I hope the critic in question will not construe anything personal from these remarks, but I would like to hear the opinions of some older and more experienced men than myself on this subject.

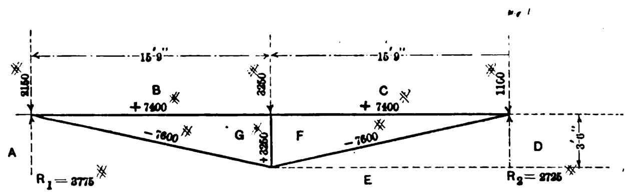


Fig. 4.—Load Diagram in Which "+" Denotes Compression and "−" Denotes Tension.—Scale 3-32 In. to the Foot.

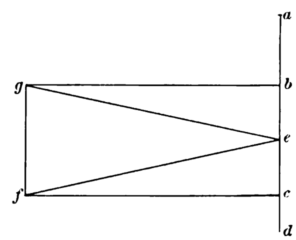


Fig. 5.—Stress Diagram.—Scale, ½ In. Equals 2400 Lb.

Conical Roof for Concrete Reservoir.

Design Wanted of Cabinet Maker's Tool Chest.

From J. A. B., New Westminster, B. C.—I am a steady reader of *Carpentry and Building* and regard it as an excellent magazine for building mechanics. I find it of great help and come to the readers of the Correspondence columns for assistance. Will some one furnish for publication drawings of a cabinet maker's tool chest and describe its arrangement and construction?

Plans Wanted for a Low Cost Dwelling.

From E. R. B., Coldwater, Mich.—I have been a reader of the Correspondence Department of *Carpentry and Building* for three years and now come to the practical readers for assistance. I would like to have any who may be interested in so doing send for publication the floor plan for a medium size dwelling of modern construction to contain a hall, living room, dining room, bed room, clothes closet and bath room, with a kitchen which may constitute an extension at the rear of the main portion of the house.

The "Work Line" on the Side of a Rafter.

From E. A. W., Concord, N. H.—Referring to the letter of "F. S.," Hermitage, Tenn., in the February issue of the paper, I would like to ask why some consider it necessary to draw a "work line" on the side of a rafter? I have always found that the length of a rafter on the upper edge is the same from a point *plumb* over the outside of the plate to the peak of the rafter, as it is on the so-called "work line."

SOME PROBLEMS IN STAIRBUILDING.—VII.

By MORRIS WILLIAMS.

HAVING shown in preceding issues how to develop a section cut obliquely through a square block or prism and the use made of it in the laying out of a face mold for a wreathed hand railing, we will at this time further elucidate the adaptability of the principle involved in the construction of a stairway starting with a few sweep steps and a "scroll" hand rail. A partial plan and elevation of such a stairway is shown in Fig. 50, while Fig. 51 shows the most simple method to describe the "scroll."

Referring to Fig. 51, measure from *a* to a distance equal to the width it is desired to make the scroll, say,

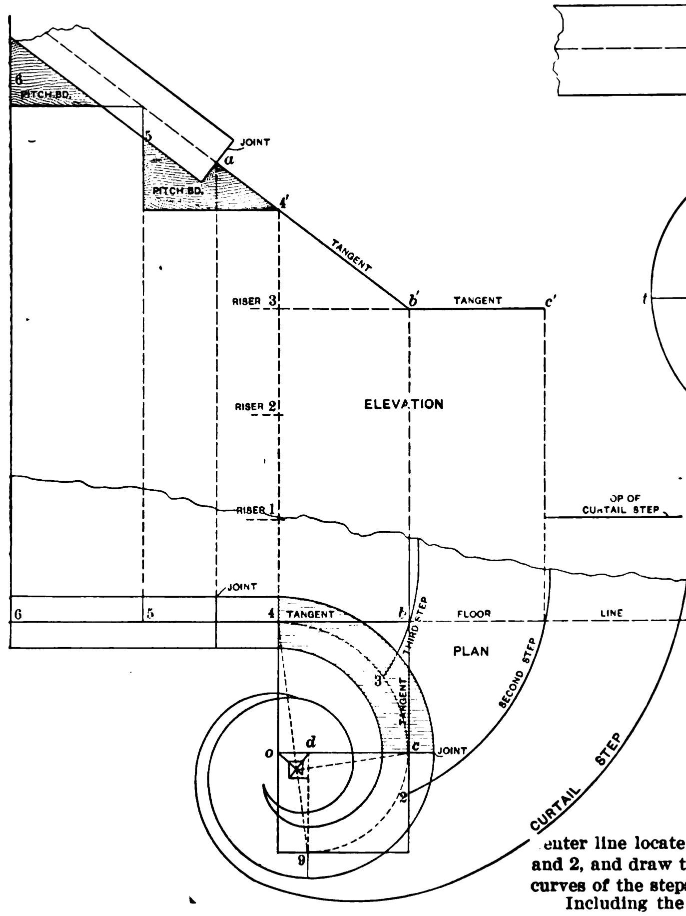


Fig. 50.—Plan of Scroll and Sweep Steps; Also Elevation of the Plan Scroll Tangents 4-*b* and *b*-*c*.

Some Problems in Stairbuilding.—VII.

for example, 18 in. Divide this into eight equal parts, as represented by the numbers 1, 2, 3, 4, &c. Find the center between the fourth and fifth divisions, as indicated at *o*. Now from *o* draw a perpendicular line to *n*. Take *o* for a center, and with *o a* as radius describe the quadrant curve from *a* to *c*.

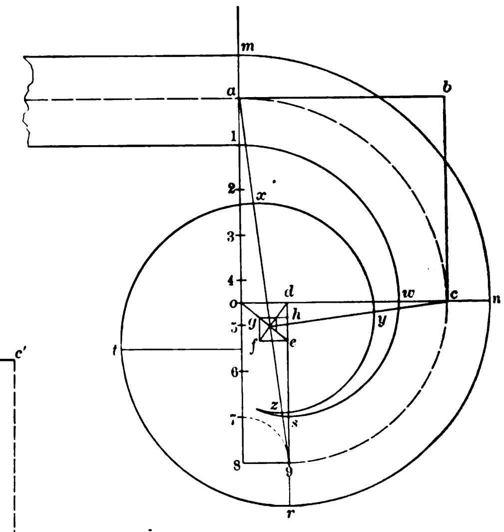
On each side of *a* place half the width of the rail, as indicated at 1 and *m*; from the same center *o* draw the quadrant curves shown from *m* to *n* and from 1 to *w*. Draw a line from 9 to *d*; also from 9 to *a*. Now take *d* for the second center and *d n* for the radius and draw the quarter turn from *n* to *r*.

Again take *d* as a center and with *d w* as a radius draw the quarter turn from *w* to *s*.

To find the third center draw a line from *c* square with the line 9 *a*, and through the point of intersection draw a line from *o* to *e*. Now take *e* for a third center and draw the quarter curve from *r* to *t*.

To find the fourth center draw a line from *d* to *f* and from *e* to *f*. Take *f* for the fourth center and draw the quarter turn from *t* to *x*.

Take *g* for the fifth center and draw the quarter curve from *x* to *y*. Take *h* for the sixth center and draw the quarter turn from *y* to *z*, thus completing the inside and outside curves of the scroll rail.



. . . 51.—Diagram Showing How to Lay Out a Handrail Scroll.

After drawing the scroll upon a thick piece of pasteboard or thin piece of wood, use it as a pattern or template upon a drawing board, and trace the complete scroll to define the plan and center line of the scroll rail, as indicated in Fig. 50. The center line, as shown in Fig. 51, from *a* through *c* to the point 9, will indicate the center line of the stringer as well as the center line of the rail, shown from 4 through *c* to the point 9 in Fig. 50. Upon this center line locate the risers, as shown in Fig. 50, at 4, 3 and 2, and draw the sweep of each riser, as shown by the curves of the steps.

Including the riser of the curtail step, it will be observed that the curve of the scroll contains four risers, and that the fourth riser is fixed right in the springing of the scroll.

Now erect a perpendicular line upon the springing point 4 and measure upon it to 4′ the hight of the four risers contained in the scroll curve. Place the pitch board at 4′ and draw the pitch of the straight steps through 4′ to *b*′. From *b*′ draw a level line to *c*′ and make it equal in length to the line *b c* of the plan. The line 4′ *b*′ will be the elevation of the plan tangent 4 *b*, and the line *b*′ *c*′ will be the elevation of the plan tangent *b c*.

We are now ready to lay out the face mold, which is shown in Fig. 52. In this diagram make *a* 4′ *b*′ equal to *a* 4′ *b*′ of Fig. 50. At right angles to it draw the line *b*′ *c*′ equal in length to *b*′ *c*′ of Fig. 50. Complete the square by drawing a line from *c*′ to *o* and from *o* to 4′. The line 4′ *b*′ in Fig. 52 will represent on the face mold the raking tangent shown at 4′ *b*′ in Fig. 50, and the line *b*′ *c*′ will represent the level tangent *b*′ *c*′ of Fig. 50.

The angle at *b*′ will be the angle required between the tangents upon the face mold to give them the right direction to square the joints at each end.

The line c' o will be the major axis and the line o 4′ will be the minor axis. At 4′ on the minor axis make the mold equal in width to that of the straight rail of the flight, and at the end c' make c' n and c' m equal to m n of diagram D on the long edge of the bevel.

In order to draw the curves of the face mold proceed as follows: Place on the dividers the distance o n of the major axis, fix one leg of the dividers in i on the minor axis and describe the arc w indicated by the dotted line and cutting the major axis in the points 1 and 1. Place pins at 1 and 1 and tie a string to each pin. Extend it to i and place a pencil at this point as indicated in the diagram and sweep the outside curve from z to n. For the inside curve place on the dividers the distance shown on the major axis from o to m; fix one leg of the dividers in the point x on the minor axis and draw the arc y cutting the major axis in the points 2 and 2. Stick the pins in these points, to which to tie the string, and then extend it to x on the minor axis, where the pencil is shown. Then sweep the inside curve from x to m.

Now measure from 4′ to a a distance equal to the shank 4′ a of the elevation, Fig. 50. Make the joint at a square to the tangent 4′ b', and at the end c' square to the tangent b' c', thus completing the laying out of the face mold.

The bevel to square the wreath is shown in diagram D to be the upper angle of the pitch board, and is applied to the end c', as shown in Fig. 52.

In Fig. 53 it is shown how the wreath is squared by applying the bevel to the end c' toward the inside of the wreath. The distance from d to b in this figure indicates the thickness of plank required for the wreath. The square section of the rail at the end a, in addition to showing that no bevel is required at this point, also indicates that the wreath when squared should be kept in the center of the plank all through from one end to the other.

It will be observed that the wreath will extend over and above the plan curve shown on the plan Fig. 50 from 4 to the joint at c, and that, owing to the bottom tangent b' c' being a level tangent, as indicated in the elevation, the wreath at the end c will be level after it is squared, and therefore will butt square to the remaining level portion of the scroll and curve, which will be an exact duplicate of the plan curve of the scroll and is shown unshaded in Fig. 50.

It will also be observed that according to this construction, as shown in the elevation of Fig. 50, the scroll rail when in position will stand above the top of the curtail step, a distance equal to 2 risers, in addition to the length of balusters of the straight flight. Assuming the length of the short baluster of the flight to be 2 ft. 4 in., then the balusters upon the curtail step directly under the scroll curve will have to be the depth of two risers longer.

This treatment of a scroll rail may not be the best, but is certainly the most simple. A great many stair builders and architects maintain that a scroll rail to give the best effect when in position ought to follow the nosing of the steps, so that the balusters all around the curve will be the same length as those of the straight flight adjoining.

To effect such a condition another treatment of the handrail must be followed and which will be presently explained. The method under consideration in the present article is often applied, however, in practice. The writer's main object in presenting it has been to show how simple it is to lay out a rail over and above a scroll plan once it is known how to develop a section through a square block oblique in one direction to its axis. In a preceding article the development was shown to be merely a formation of a square composed of two sides equal to the pitch of the cut in the block, and the other two sides equal to one side of the base or plan.

The development of such a section is shown in Fig. 52 to be composed of two sides, 4′ b' and o c, equal to the inclined tangent 4′ b' of Fig. 50, and of two sides, o 4′ and c' b', equal to one side of the base or plan of the rail tangent, as shown at b c in Fig. 50.

It will be noticed that by using these lines to form a square we find the tangents of the face mold and the angle between them, which is the prime achievement in the laying out of a face mold.

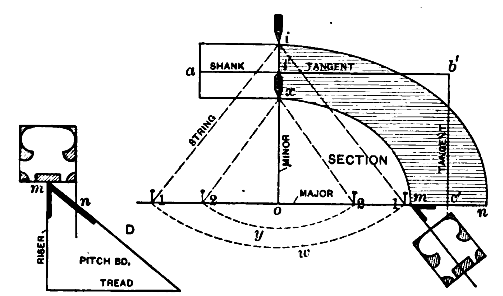


Fig. 52.—Face Mold for the Wreath Rail.

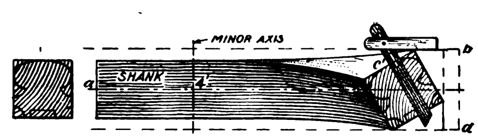


Fig. 53.—Showing How the Wreath Is Squared.

Some Problems in Stairbuilding.—VII.

Timber Seasoning and Wood Preservation.

In recent years the importance of preserving timber from decay by the use of various antiseptics has been generally recognized in the United States. The value of properly seasoning timber before such treatment is not so generally known, though it is one of the most important features of the treatment.

There are three main advantages to be derived from the proper seasoning of timber—namely, the increase in strength of the timber, the greater ease of injection of antiseptics for preserving the timber, and the saving in freight charges, due to the decreased weight.

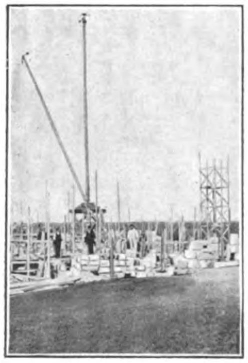
From thorough tests made by the Forest Service on various pieces of timber, it appears that thoroughly air dry or seasoned timber has about double the strength of the green material. It is well known to all operators of wood preserving plants that antiseptics are not only difficult to inject into green wood, but that it is practically impossible to obtain a uniformly satisfactory treatment of such material at an economic cost, for the purpose of insuring a prolonged life.

The last item would at first seem too trifling to be worthy of discussion, but from data obtained only recently it appears that Western yellow pine lost 50 per cent. of its green weight after three to five months' seasoning. This means a saving of 50 per cent. of the freight charges and a corresponding saving in the handling of the timber, and is, therefore, a far too important point to overlook.

Considering these three points, it will be seen that there is not only a material saving in the seasoning of timber, but also a proportionate increase in the value of timber as a structural material. The seasoning of timber is never an expensive operation, even when done artificially. In the southern parts of the United States a satisfactory degree of seasoning could be obtained by exposure of the timber to the air for a period of three to six months. In some of the Northern States, however, a somewhat longer period is necessary to secure satisfactory results.

WHAT BUILDERS ARE DOING.

THE building situation the country over continues to be of a most gratifying nature, and operations are being projected upon a scale which bespeaks a large total for the year. Many of the leading cities are developing a somewhat unusual degree of activity in the building industry, due in some cases to special causes and in others to the natural growth of population and steady demand for increased housing accommodations. Reports at hand from leading cities throughout the country for the month of April show a gain of practically 40 per cent. in the value of the building improvements for which permits were issued, as compared with the corresponding month a year ago. The percentage of increase is considerably less than was the case for previous months of the year, but this was undoubtedly due to the fact that early in 1908 the business of the country was feeling the effects of the severe depression of the fall of 1907, and, therefore, comparatively little work was under way. The record for April in the Borough of Manhattan was exceeded only once since the five boroughs were consolidated in the present Greater New York, and that was in April, 1901, when a record breaking total of 941 buildings was planned to cost $36,447,525, while the figures for April of this year were 99 buildings costing $15,709,500. The record for April of this year is largely of a speculative nature and a goodly percentage of the new construction has doubtless been projected to anticipate the impending changes in the building code of the city, which is now under revision and which, if it becomes a law, will practically prohibit the erection of non-fireproof apartments of a greater hight than five stories.



Here and there throughout the country labor disturbances in the building industry are to be noted, but there appears to be no general unrest manifested among the mechanics in the various branches of the building trades, and, with matters running smoothly, the present season should witness a degree of activity which will compare most favorably with the best years gone before.

Atlanta, Ga.

Contrary to what appears to have been the experience in a great many of the leading cities of the country building operations for April in Atlanta show a considerable falling off, as compared with the same period last year. There is, however, considerable building in progress, and mechanics in all branches of the industry are likely to be fairly well employed if all the projects now under way and in contemplation are carried through. The permits which were issued last month cover 419 building operations involving an estimated outlay of $504,662. This is a little less than half as much as the value of the building improvements projected in April last year, when 363 permits were issued for new work which called for a capital expenditure of $1,294,136.

The members of the Builders' Exchange held their second annual meeting at their headquarters in the Prudential Building on the evening of April 28. Much routine business was transacted, speeches were delivered by several of the members, officers for the ensuing year were elected, and later a luncheon was served. The officers selected for the ensuing year were:

President.............. George B. Hinman.
Vice-President.......... D. A. Farrell.
Treasurer.............. R. M. Walker.
Secretary.............. J. D. Wood.

Directors elected at this meeting were R. S. Wessels, H. M. Pearson, C. G. Bradt, E. J. Putnam and George Dowman.

After the officers had been elected there was a short executive session, and after the close of the meeting refreshments were served, as stated. A portion of the evening was given up to a musical during which vocal and instrumental numbers were acceptably rendered.

Leading contractors engaged in the building business are active in a movement looking to the formation of what will be known as the Master Builders' Association of Atlanta. A constitution and by-laws have been drawn up, and at a meeting early in May they were presented and adopted. It is expected that this movement will be of the greatest importance to local builders, as it will tend to harmonize conflicting interests and bring the builders together into a smoother working body.

Baltimore, Md.

There has been quite an increase in the amount of new building projected last month, as compared with March, although the total is not up to that of February. As compared with a year ago, however, the increase is most striking. According to the report of Building Inspector Preston, issued May 5, there were 188 permits issued in April for new improvements estimated to cost $1,047,165, and 42 permits for additions to cost $38,310, making a total of $1,085,475. The custom here in the city is to add 20 per cent. to these figures for undervaluation, thus making the total estimated cost of the new improvements $1,302,570. In the same month last year the total was $475,420, and in April, 1907, the total valuation was $881,929.

The permits issued last month covered 294 two-story brick dwellings to cost $456,900 and 27 three-story brick dwellings to cost $124,570. Of two-story frame dwellings permits were issued for eight to cost $30,700. There was also a permit for a bank building to cost $135,000 and for seven manufactories and warehouses to cost $210,500.

Buffalo, N. Y.

There has been a decided impetus in the building line the present season, as compared with a year ago, and the outlook is for a most encouraging volume of operations. Architects and building contractors are much encouraged by the situation, and with no labor disturbances every one should be fairly busy.

An idea of the increased activity in the building industry may be gathered from the figures compiled by the Bureau of Building for April, when 372 permits were issued for the erection of new buildings, repairs and alterations to existing structures involving an estimated outlay of $960,000, whereas in the corresponding month last year the estimated value of the improvements for which permits were issued aggregated $600,000.

Chicago, Ill.

Building permits issued in April furnish evidence of continued interest in new construction. While the total cost represented is slightly less than for the preceding month, it is greater than that recorded for April in any former year save one, April, 1906. The totals for April, 1909, are 1082 buildings, with 30,129 ft. frontage, costing, $8,047,900, and these figures comparing with 1182 buildings, 30,363 ft. frontage, and costing $5,920,450 in April, 1908. It will be noted that while there was an increase in cost of $2,127,450, there was a decrease of 100 buildings and 288 ft. of frontage, as against the corresponding period of last year.

The outlook for a busy and successful season among the building trades is distinctly bright and promising. Labor troubles which a month ago threatened the interruption of work in several lines have been amicably adjusted. Work in practically all departments is now going forward without interruption, and if the present degree of interest manifested in realty improvements continues throughout the year, new building records are likely to be established. The hardening tendency of steel prices is stirring to action some dilatory projects of important size which will probably be brought to closure at an early date.

The officers for 1909 elected at the annual meeting of the Masons and Contractors' association are:

President.............. A. Lanquist.
Vice-President......... William M. Crilley.
Secretary.............. E. M. Craig.
Treasurer.............. Henry Ericsson.

In this connection it may be interesting to remark that the association was organized November 30, 1906, with William Grace president, and is composed of the leading contractors in the building line in the city.

Cincinnati, Ohio.

All indications point to a most active season in the building line, and it may not be too much to say that it will prove one of the most notable in the history of the city. Most of the activity, however, is confined to the residential sections where many attractive dwellings are in course of construction. The value of the building improvements for which permits were issued in April is placed at $965,765, while in April last year the total valuation was $621,942.

Columbus, Ohio.

The report of Building Inspector R. A. Edgar for the month of April shows 231 permits to have been issued for building operations aggregating a valuation of $411,081. The greatest activity was in the Twelfth Ward, where buildings are to be erected valued at $110,575. The report for the month of April last year showed 225 permits to have been issued for new building, alterations and repairs estimated to cost $384,000.

Cleveland, Ohio.

Building operations in Cleveland continue to improve and everything points to a very satisfactory year. In addition to a large amount of smaller work under way or being planned in the line of store buildings, terraces and dwelling houses, several large business blocks will be erected in the downtown district during the year.

In the first four months of the year 2349 permits were issued by the city building inspector's office for structures to cost $3,491,471, as compared with 2127 permits issued during the same period of 1908 for structures to cost $2,719,-447, the net gain for the four months as compared with a year ago being $772,024.

During April there were issued permits for 884 buildings, additions, &c., the estimated cost of which is $1,322,153.

Plans have been perfected for the annual summer outing of the Cleveland Builders' Exchange. Participants will leave on the steamer City of Cleveland, Monday evening, June 28, for Detroit, proceeding from that city on the following morning by a special vestibule train on the Pere Marquette Railroad to the Lake Harbor Hotel on Mona Lake, an inland summer resort adjacent to Lake Michigan. The party will remain there until Friday, occupying the time in boating, fishing and other amusements. On the return to Detroit time will be allowed for visiting the summer attractions about that city, and the party will take the night boat, arriving home Saturday morning.

Denver, Colo.

For the first time in 18 months the record of building operations shows a decrease as compared with the corresponding month of the year before. While the percentage of loss is not particularly great or significant yet it is noticeable simply because it is a decrease instead of a gain, and breaks the chain of increases which have continued over a rather protracted period. The reason for the falling off in operations as compared with a year ago has been due to the labor troubles with the carpenters, but the friction is lessening, and it is hoped that matters will be amicably adjusted in season to make the month of May show up to much better advantage. It is interesting to note that the largest permit in April called for only $70,000, while in April last year there was one for $350,000 and three involved an estimated outlay of $575,000.

According to Building Inspector R. Willison there were permits issued for 359 buildings in April involving an estimated outlay of $1,157,650, while in the same month last year permits were taken out for 305 buildings, but calling for an outlay of $1,412,745. Of the permits issued last month 221 were for brick residences costing $534,600, while only seven were for frame residences costing $5,800. There were seven apartment houses planned costing $191,000 and 14 business business bulidings costing $134,600. Terraces continue to be erected, permits having been issued for four to cost $55,000.

For the first five months of the current year 1201 permits were issued for buildings costing $3,712,823, while in the corresponding period of last year 887 permits were taken out for new work calling for an outlay of $3,167,995.

Detroit, Mich.

The volume of building operations last month was the largest for any April, with one exception, in the history of the city, the record being held by April, 1906, when building activities were at their maximum. The statistics compiled in the Fire Marshal's office show that last month permits were taken out for 361 new buildings to cost $1,256,470, and for 65 additions to cost $68,250, making a total of $1,344,700. These latter figures compare with a total of $932,350 in April last year and with $1,271,400 in April, 1907, $1,438,-100 in April, 1906.

For the four months of the current year the total value of building improvements for which permits have been issued is $3,849,150.

Kansas City, Mo.

There has been a trifle less volume of building operations this last month than was the case a year ago, but it is not altogether surprising when the fact is considered that the value of the building improvements for which permits were issued in April, 1908, broke all previous records.

According to the figures of the Building Inspector's office, the value of the operations last month amounted to $1,553,990, while in April, last year, the total valuation was $1,659,050.

Los Angeles, Cal.

Los Angeles builders are fairly busy, though the summer promises to be rather quiet, on the whole. It was thought that the record of building permits for April would show but little change from that of the month preceding. As a matter of fact, it showed a considerable drop, though contractors say that they are now fully as busy as they were earlier in the year.

The permits for the month of April numbered 722, with a total valuation of $1,019,000, a falling off of $100,000 as compared with March, but an increase of $355,000 as compared with the month of April, 1908. Approximately three-quarters of the April building consisted of frame structures, the remainder being about equally divided between brick and reinforced concrete. There were three reinforced concrete buildings valued at $102,000, 17 brick buildings valued at $164,000, 292 one-story frame buildings valued at $360,-503, 33 one and one-half story frame buildings valued at $69,058, 50 two-story frame buildings valued at $193,530, 2 three-story frame buildings valued at $37,000, and a large amount of smaller work, alterations, &c.

No very large buildings are in immediate prospect, though several large structures are planned and may be started before the summer is over. All lines of building materials are in abundant supply, as is labor also.

Louisville, Ky.

There has been a slight increase in activity in building operations and the season is opening up with good prospects for the immediate future. The monthly report compiled in the office of the building inspector of the city shows that in April 366 permits were issued for new buildings, alterations, repairs, &c., involving an estimated outlay of $274,432. In April last year 340 permits were issued for improvements having an estimated value of $251,421.

The management of the Builders' Exchange is conducting a systematic campaign, under the leadership of George T. Cross, with a view to increasing the membership of the organization. The *personnel* of the Membership Committee consists of George T. Cross, chairman; Alfred Struck, Edward Wagner, E. G. Heartick, Joseph Ingram, Fred Schupp, J. C. Zulauf, Fred Bicker, Gus Albrecht, Chris Childers, Charles Daubert, J. C. Meyer.

Milwaukee, Wis.

An examination of the figures compiled in the office of Building Inspector E. V. Koch for the month of April indicates a rather better class of work this season; that is, more pretentious structures than was the case at this time last year. This conclusion is based upon the fact that 490 permits were issued from the office of the building inspector last month for improvements estimated to cost $1,226,842, while in April, last year, there were 572 permits issued, but which called for an estimated outlay of only $897,197. In other words, the increased number of permits called for a decreased outlay as compared with April, this year.

A committee to revise the building code of the city, consisting of the following, has been recommended for the approval of the City Council: E. V. Koch, Chief T. A. Clancy of the Fire Department, City Engineer C. J. Poetsch, Architects G. B. Ferry, H. P. Schnetzky and Charles Ringer, and Contractors H. C. Fuldner, G. E. Kahn and Henry Ferge.

Newark, N. J.

According to the monthly report of Superintendent William P. O'Rourke of the Building Department, April showed the largest volume of building operations for any month this year and a marked advance over April, last year. The figures show that in April of the current year, 281 permits were issued for improvements estimated to cost $1,443,169, while in April last year 248 permits were issued for improvements calling for an outlay of $759,493.

New York City.

The feature of the local building situation continues to be the heavy filings of plans for improvements both in the business sections and in the outlying districts, where suburban property is being improved upon an extensive scale. A phase of the improvements in the business section is the razing of old buildings to make way for modern structures which will afford a more adequate return upon the investment and land values. This has been especially noticeable in connection with some of the older hotel buildings, particularly on the line of Fourth avenue, where already six hostelries have been or are about to be demolished in order to make way for new construction. These are the Everett House at Seventeenth street; the Belvedere, Clarendon and Florence at Eighteenth street; the Ashland at Twenty-fourth street, and the Putnam at Twenty-sixth street.

In the Borough of Manhattan more new buildings were planned in April than, with one exception, in any corresponding month since the five boroughs were consolidated into Greater New York. According to the report of Superintendent Murphy of the Bureau of Buildings, 99 buildings were planned, to cost $15,709,500, as against 50 buildings to cost $10,139,137 in April last year.

In the Borough of the Bronx the improvement has been marked and 345 new buildings were planned in April to cost $3,130,000, whereas in the same month last year permits were taken out for 156 buildings to cost $1,431,245.

For some time past there has been great activity in the outlying districts of Brooklyn, and this season operations are also being conducted upon quite an extensive scale. There were 774 permits issued for new buildings, involving an estimated outlay of $4,594,000, as compared with 339 buildings to cost $1,899,500 in April last year. Many of the improvements under way consist of two-family dwellings, entire rows of which are to be seen in the Flatbush and other sections.

Some idea of the extent of the demand for dwelling houses in the Borough of Queens may be gained from the active filing of plans in the Bureau of Buildings. The figures for April, as furnished by Superintendent Carl Berger, show permits to have been issued for 452 new buildings, estimated to cost $1,578,952, while in the corresponding month last year plans were filed for 321 buildings to cost $947,011. The demand for comparatively expensive dwellings is slowly increasing, as revealed in the erection of more costly types of residence in many sections along the north shore.

The four months of the present year have been the most active in the history of the bureau of buildings of the Borough of Queens. Plans were filed for 1543 buildings, estimated to cost $4,784,791, whereas in the first four months of last year permits were taken out for 968 buildings involving an estimated outlay of $3,457,155. Since the opening of the new Queensboro Bridge, Long Island City has shown great activity in the building line.

At the annual meeting of the Building Trades Association, held in April at their club rooms in the Builders' Exchange Building, West Thirty-third street, officers for the ensuing year were elected as follows:

President.............Benjamin D. Traitel.
First Vice-President....C. G. Norman.
Second Vice-President..Bond Thomas.
Treasurer.............A. N. Chambers.

The reports of the various committees presented show the association to be in a flourishing condition, the financial statement being unusually gratifying. The chairman of the Board of Governors is Ross F. Tucker.

Omaha, Neb.

The present season has been the most active so far as building operations are concerned of any similar period in the history of the city, Building Inspector Withnell having issued permits for new buildings to cost more than the total erected in any other four months since the establishment of his office. Last month 176 permits were taken out for building improvements to cost $489,350, while in April last year the same number of permits were issued, but they covered buildings to cost only $301,085. The permits issued last month covered 125 dwellings to cost $348,800; four warehouses and factories to cost $83,500; six store buildings to cost $31,500.

The total for the first four months is $1,618,885, while during the first four months of last year the total value of the improvements for which permits were issued was $894,905.

Philadelphia, Pa.

The forward movement in building operations continues, and statistics for the month of April show a very substantial gain, reaching almost record proportions. So far this year the total expenditure has exceeded that for the same period in 1908 by almost $5,000,000, and should the same activity be maintained throughout the year, we will again make a new record. While the work undertaken during the past month has been largely in dwelling house operations, ground has been broken for the new $2,000,000 Curtis Building, although the formal permits have not been granted. Several other building propositions, running into hundreds of thousands of dollars have also been contracted for, but not yet been started, so that the outlook on the whole is very favorable.

From the statistics of the Bureau of Building Inspection, it is to be noted that 964 permits were issued during the month of April for 2192 operations, at an estimated cost of $5,087,660, which, with one exception, is the largest total for any month of April in the history of the bureau.

Dwelling operations continue to lead in point of activity. During the past month permits were taken out for 1249 two-story dwellings, 185 three-story and 22 four-story dwellings at a total cost of $3,296,040, of which the two-story operations contributed $2,352,505, an increase of nearly half a million dollars over that of the previous month. To show how pronounced the gain in work of this class has been, it is to be noted that the total expenditure for this class of work during the past four months has been $7,758,045, as compared to $3,814,535 during the same period in 1908. During the same period in 1907, when building was quite active, the total estimated cost of this class of work was $7,601,585.

Portland, Ore.

At the current rate of improvement over past years, the present will prove by far the best building year in the history of Portland. The value of the building permits issued in April reached a total of $1,650,500, breaking all previous records. The best previous month was February of this year, when the total valuation was $1,328,540. These two months, with the averages for January and March, give the record for the year such a lead over previous years that builders are confident that 1909 will lead all others.

The bulk of the new work consists of residences, though the most pronounced increase in probably in the line of apartment houses which are being started in all grades from the cheapest to the most expensive. Six large modern buildings of this sort are now going up in the immediate neghborhood of King and Washington streets. As is the case in other coast cities, there is a decided shortage in large buildings of the more expensive sort as compared with the years immediately preceding. Whether or not any of the large buildings announced for early construction will be started during the summer seems to be a matter of doubt.

Salt Lake City, Utah.

In spite of the tardy approach of spring, operations for an active building season have been going on and permits for new buildings are being taken out upon a scale which augurs well for the mechanics engaged in the various lines of this industry. For April the total number of permits issued was 217, calling for an estimated expenditure of $585,200. In April last year the permits issued call for an outlay of $380,990.

The permits issued last month do not cover any of the several large undertakings which are in progress, so that the 217 permits issued make an average for each house of about $2700. The general run of the permits calls for the erection of small and moderate cost homes, some as low as $1500, and from this figure upward.

San Francisco, Cal.

The predictions made some time ago that San Francisco would have rather a quiet summer in building lines is being fulfilled. Though the total volume of work under way and in prospect continues large, it is barely holding its own, and during the month just closed the amount of new work started fell off as compared with the preceding month. During April the total value called for by the permits issued was $2,827,-054, a drop of something over $300,000 as compared with March, but a gain of about $800,000 as compared with the month of April, 1908.

The record for April contains no permits for the tall, costly structures that characterized the building situation for the two years after the great fire. A large number of permits were, however, issued for brick buildings of moderate hight, chiefly of class C type. A few reinforced concrete structures, also of class C type, are being built. A large amount of frontage in the downtown business district is being cleared preparatory to the construction of business buildings. Most of these will be from three to six stories in hight.

The building of flats and apartment houses is on the increase, the bulk of this line of work being in those parts of the city where frame construction is permitted. There has been considerable movement in the way of residence building, though this feature continues, as has been the case ever since the fire, to be but a small percentage of the whole. Some builders hold that a revival in residence building is due and are predicting that this sort of work will be a characteristic of the summer and fall. Desirable residence property in the city is, however, held rather high for ordinary residence purposes, much higher than outside property equally accessible to the business district of the city, and most builders hold that residence builders will continue to devote their attention largely to Oakland and other suburban cities and towns.

The materials situation is more favorable to builders than earlier in the year and, if money continues easy to get, may lead to a considerable revival in smaller buildings, particularly in frame building. Brick is about the only article on the list that continues really firm. This is being held at $9, with a pretty good demand and the bulk of the output in the hands of a few companies. Cement and lime appear weaker, and lumber and all timber products are decidedly so. This holds true for the entire coast and the outlook is for lower rather than higher prices. Labor is plentiful, and though the old scale is still nominally in effect, it is understood that concessions are made.

Seattle, Wash.

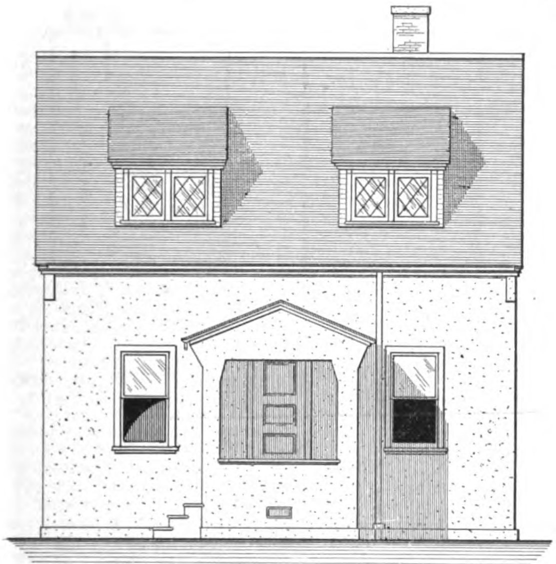
The building situation in Seattle, which has been improving since the first of the year, went ahead with a rush during April. In that month the building record showed a total of 1669 permits, with a valuation of $2,137,385. This not only exceeded by far the records of all former Aprils, but was with two exceptions the best month as regards building in the history of the city. The building operations for the month in question were three times as large as those of the same month in the two preceding years, and more than double those of April, 1906.

The total for the first four months of the year is also a record breaker, reaching a total of nearly $8,000,000, or considerably more than for any preceding similar period. Builders assert that the phenomenal building era is independent of the Alaska-Yukon-Pacific Exposition, and certainly little of the April showing can be traced directly to the fair. As a matter of fact, however, a considerable part of the work begun this spring is indirectly due to the coming exposition.

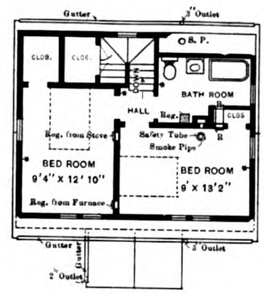
There is a noticeable lack of large building, the most important permits issued during the month being for $150,-000, for which figure three permits were taken out. Most of the permits granted were for buildings ranging below $10,000 in cost. There was a noticeable increase in the number of permits granted for two-story frame buildings. The building of one-story residences continued a large factor.

PRIZE DESIGNS IN ROCHESTER'S COTTAGE COMPETITION.

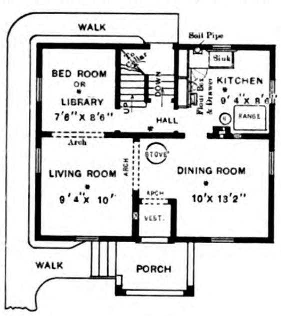
SOME months ago a competition in plans for cottages of comparatively low cost was conducted by the Rochester Chamber of Commerce, the contest covering three classes of buildings, the first including houses not to exceed $1500 in cost, the second not to exceed $1250, and the third not to exceed $1000. The Committee of Award, into whose hands the drawings were finally submitted for examination, recently announced the results of its labors, and in our issue for February we published the names and addresses of the winners of the several prizes in the three classes in question. We now have pleasure in presenting to the attention of our readers the weights and cord and glazed with double thickness sheet glass. The front door was to be 1¾ in. thick, neatly paneled and molded with glass in upper panel, while the rear door was to be 1⅜ in. thick, with double thickness glass in the upper panel. All other regular doors were to be 1⅜ in. thick with four panels. Provision is made for heating by furnace in the cellar, although the design as submitted shows a stove for heating the two main rooms on the first floor and a sleeping room on the second floor. The plumbing fixtures include kitchen sink and hot water boiler, and in the bathroom are to be a low down combination water closet and tank, an iron enameled washbasin, and iron enameled bathtub. The



Front Elevation.—Scale, ⅛ In. to the Foot.



Second Floor.
Scale, 1-16 In. to the Foot.



First Floor.
Scale, 1-16 In. to the Foot.

Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

FIRST PRIZE FOR COTTAGES COSTING $1500.

Prize Designs in Rochester's Cottage Competition.

elevations and floor plans of the designs awarded first prizes in the three classes of cottages mentioned.

As previously announced, the winner of two out of three first prizes was Miss Esther M. Byers of 119 Post street, Rochester, N. Y., and according to her specifications the cottage in the $1500 class was to be of balloon frame construction, with exterior walls from base to cornice of rough cast plaster laid on metal lath securely attached to the studding, while the roofs and vertical walls of dormers were to be covered with 16-in. red cedar shingles laid 5½ in. to the weather on the side walls and 5 in. to the weather on the roofs. The floor joists were to be covered with ⅞ x 2½ in. matched flooring; the walls and ceilings lathed and plastered with one coat patent pulp plaster, and the window sash hung with house is to be piped for gas and provided with an electric bell operated with push button at the front door.

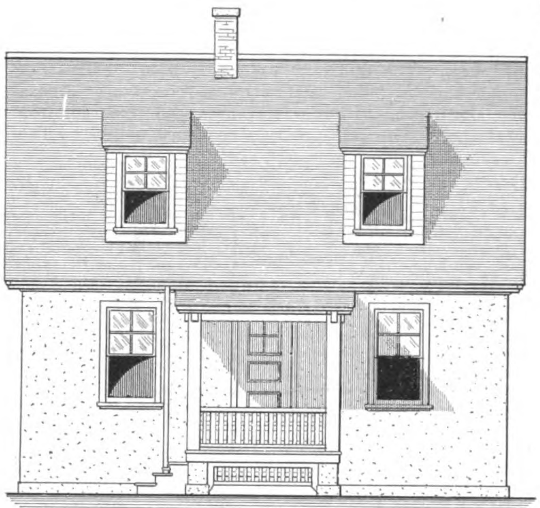
The exterior wood trim of the cottage is to receive two coats of white lead and oil paint, while the interior wood trim is to be given a coat of water stain, one coat of white shellac and finished with one coat of interior varnish.

The winner of the first prize in the competition in cottages not to exceed in cost $1250 was also Miss Byers, the winner of the first prize in the $1500 class. According to the specifications the general style and finish of the cottage was to be much the same as in the case just described, the difference consisting largely in the number and size of the rooms.

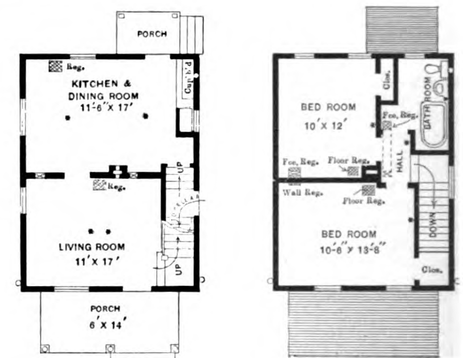
In the third class, being that for $1000 cottages, the first prize design was that submitted by T. T. Kelly, Youngstown, Ohio. Here the underpinning is to be of concrete blocks, the mixture being 1 part cement to 3 parts sand and 4 parts crushed stone or gravel. The exterior framework is covered with white pine siding, and the roof with red cedar shingles exposed 5 in. to the weather. The first and second floor joists are to be 2 x 8 in., and the attic joists 2 x 4 in., all placed 16 in. on centers. The rafters and studding are also to be 2 x 4 in., placed 16 in. on centers. The floors are to be of Georgia pine and the interior of the house is to be finished in yellow pine for staining. The porch floors are to be of Georgia pine and the front porch columns are to be of poplar 6 in. in diameter.

The kitchen is to have a cast iron white enameled sink 18 x 30 in. in size, while the bathroom is to be fitted with a plain syphon jet bowl with copper lined oak tank, with flush and supply pipes nickel plated. There is also to be a 4½-ft. cast iron white enameled bathtub with nickel plated trimmings, also an enameled one-piece half circle apron lavatory.

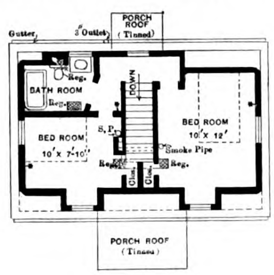
The exterior woodwork is to have two coats of lead and oil paint, and the interior woodwork is to have one coat of stain filler with two coats of varnish. The cottage is heated by stoves with registers in the second floor, but wall pipes are to be placed for future heating with furnace.



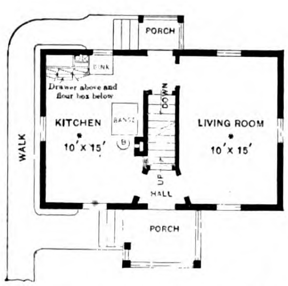
Front Elevation.—Scale, ⅛ In. to the Foot.



First Floor. Second Floor.
Scale, 1-16 In. to the Foot.

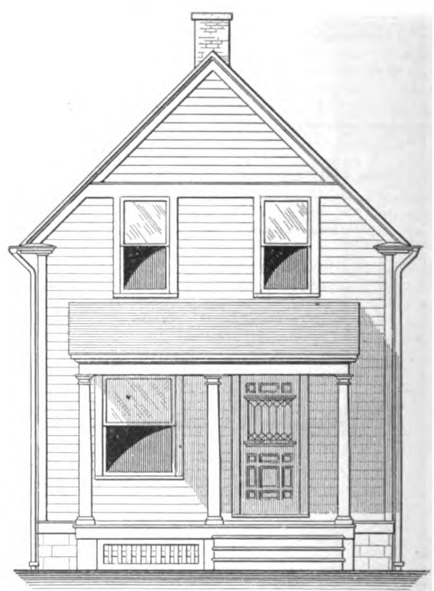


Second Floor.



First Floor.—Scale, 1-16 In. to the Foot.

FIRST PRIZE FOR COTTAGES COSTING $1250.



Front Elevation.—Scale, ⅛ In. to the Foot.

FIRST PRIZE FOR COTTAGES COSTING $1000.

Prize Designs in Rochester's Cottage Competition.

Closing Exercises at the Mechanics' Institute.

The graduating exercises of the Mechanics' Institute took place at Mendelssohn Hall, West Fortieth street, near Broadway, New York, on Thursday, April 22. The exercises began with a short address by Wm. J. Hoe, the president of the General Society of Mechanics and Tradesmen of the City of New York, under whose management the institute is conducted. He was immediately followed by Louis Rouillon, M.A., the director of the school, who explained that the school could accommodate and give free instruction to 2500 young men in physics, mathematics, mechanical drawing, architectural drawing, free hand drawing from life and clay modeling, and announced that over 2000 applications for the next year's classes had already been entered, after which he awarded diplomas to 121 graduates coming from the various classes.

George E. Hoe, one of the older members of the society and the founder of a prize fund, made a short and interesting speech, telling of the earliest efforts of the society in the work of conducting a school for the dissemination of technical knowledge, gave some good advice to the graduates and awarded seven prizes to members of the graduating class. Among these one was given to John T. O'Connor of the class in architectural drafting, one to Albert O. Lippke of the class in free hand drawing, one to George Magnani of the class in clay modeling, one to Ferd Cerracchio of the class in decorative design and one to Charles Hahn of the class in sheet metal drafting.

The address to the graduating class was delivered by Alex. C. Humphreys, president of the Stevens Institute of Technology.

Those desiring admission to the classes which begin work September 28 may address Mechanics' Institute, 20 West Forty-fourth street, New York City.

LAW IN THE BUILDING TRADES.

By A. H. L. Street.

ACCEPTANCE OF BUILDING—WAIVER OF DEFECTS.

As a general rule, where the owner of a building accepts the same and takes possession thereof, and at the time of doing so the building is incomplete and contains patent and obvious defects, the acceptance will be deemed a waiver, and the contractor will be entitled to recover the amount earned on the contract.

An acceptance of a building or structure that has been completed, or which contains latent defects either in the class or character of its workmanship or the quality of material used, will not be deemed a waiver of such latent defects; but, on the contrary, the owner may maintain his action against the contractor for breach of the contract at such time as he discovers the extent of the defects or after he has had reasonable time and opportunity by due diligence to have discovered the same.

Where a building has been completed, and the owner thereof has entered into possession of the same on the theory that the building is a completed structure, and he later discovers that the building was defectively constructed and not properly tied to the adjoining wall, and the front falls out, the owner may recover the damages thus incurred on account of breach of the contract as an offset against the contractor who is seeking to foreclose his mechanic's lien for the construction of the building.

The fact that the owner of a building went into possession thereof with knowledge that the building contained latent defects in its construction and inferior material will not prevent his claiming damages for such defects as an offset against the contractor's action to recover the contract price therefor, unless an express waiver is shown, or such other facts and circumstances as would amount to a waiver of damages.—Idaho Supreme Court) Steltz *vs.* Armory Co., 99 Pac., Rep. 98.

REPAIR OF BUILDINGS—CONTRACTOR'S LIABILITY TO TENANT.

Where a landlord, under duty to make repairs, employs an independent contractor to do certain specific work needed to be done, the independent contractor may be held liable by the tenant for injuries resulting, prior to the acceptance of the work by the landlord, from the negligent manner in which the contractor has performed the work. However, if the contractor fulfills his particular contract with ordinary care and diligence, he is not liable for injuries resulting by reason of defects in the original plan of the work, or because the repairs as made prove inadequate to fulfill the landlord's duty in the matter.—(Georgia Court of Appeals) Bell & Son *vs.* Kidd & Roberts, 63 S. E., Rep. 607.

SUBCONTRACTORS—RIGHT TO LIEN—PAYMENTS.

Where the owner has in good faith paid the principal contractor the full amount due him, a subcontractor is not entitled to a mechanic's lien for money due from the principal contractor, even though the owner has permitted the subcontractor to proceed with the work. Where a contract specially provided for payment of the balance due for work performed on premises by a contractor by notes secured by mortgage on the premises, in absence of fraud, the notes were payment of such balance, and the contractor could not insist on payment in any other manner.—(New York Supreme Court, Appellate Term) Rosenbaum *vs.* Paletz, 114 N. Y. S., 802.

RISKS ASSUMED BY WORKMEN—EMPLOYER'S DUTY—LIABILITY FOR INJURY.

An experienced employee, who undertakes the work of wrecking a building, which is necessarily dangerous, assumes the ordinary risks incident to the employment.

The employer's duty to furnish a safe place to work does not apply to the wrecking of a building, which is necessarily hazardous.

Where the work is necessarily dangerous, as the wrecking of a building, the employer is not bound to exercise ordinary care to discover the danger, so that he would not be liable for injuries resulting from unknown defects, even though they were discoverable by exercising ordinary care.

A contractor, employed by defendant's architect to tear down a building, who employed and paid the laborers and directed their work, if he was an employee, and not an independent contractor, as well as the architect himself, who had general charge and superintendence of the work, and another employee of defendant who sometimes directed the performance of the work in the contractor's absence were all superior employees to a workman employed on the building, for whose acts in the course of the work defendant would be liable as if it had personally directed the work.—(Kentucky Court of Appeals) Ballard & Ballard Co. *vs.* Lee's administrator, 115 S. W. Rep., 732.

A hod elevator company, contracting with a construction company to furnish an elevator in the construction of a building and an engineer to operate it, is liable for injuries to an employee of the construction company by negligence of the engineer in moving the elevator without warning, and without receiving any signal from the employees of the construction company, though the foreman of the construction company was authorized, "if the engineer was not satisfactory, to remove him and get another one," since such authority was not a relinquishment by the elevator company of the control of the engineer, but at most merely authority to the construction company to dispense with the services of the engineer furnished them if he was not satisfactory, and to require the elevator company to send another engineer to take his place.

The fact the engineer reported for work to the foreman of the construction company and received instructions from the employees of the construction company as to when to raise and lower the elevator did not change the character of his employment from that of an employee of the elevator company to that of an employee of the construction company and a fellow servant of one of the employees injured, since the engineer was employed and paid by the elevator company to operate the elevator, and was acting within the scope of his employment when the accident occurred, having no connection with the work for which the person injured was employed, or which he was doing.—(Appellate Division, New York Supreme Court) Henry *vs.* Stanley Hod Elevator Co., 114 N. Y. S., 38.

SCAFFOLDING.

A board laid across stringers of an unfloored hallway on the fifth floor of a building in course of construction for passage from room to room was "scaffolding" within Labor laws (Laws 1897, p. 467, c. 415), section 18, prohibiting employers from furnishing unsafe scaffolding. Under the statute negligence of the employer may be inferred from the breaking of a board ¾ in. thick used as scaffolding, in the absence of explanation.—(New York Supreme Court, Appellate Division) Convey *vs.* Finn, 114 N. Y. S., 864.

Stucco Extensively Used Centuries Ago.

It is generally conceded that there is no material for the decoration of both the exterior and interior of houses that has undergone more of a revival during the last few years than stucco, the use of which dates as far back as 3000 years before the Christian era. At the present day stucco is being used on the exterior of both brick and frame structures, and day by day its popularity is increasing. Of late years the "pebble dash" finish or "rough cast," as some term it, has also been growing in popularity, and the end is not yet. In discussing the subject of stucco and the extent to which it was used centuries ago, George P. Bankart, a well-known architect, says:

"It would be extremely interesting to attempt to trace, to some extent, throughout the infinite space of time, when and where plaster first became known as a decorative medium. It was to the employment of stucco that the crude unbaked mud bricks, or sun-baked brick walls of antiquity, owed their preservation.

"Among the ruins of Mesopotamia, in buildings dating back probably from 3000 to 3500 B.C., are to be found at the present time walls covered with stucco, which, in a great measure, owe their preservation to the use of this material. There were frescoes on these walls, as a rule, and decorative modeling, probably.

"The Egyptians covered their buildings with a slight coating of stucco to conceal the seams of the stones and take on the painted decoration. The pyramids of Memphis were lined with coating of stucco, the remains of which are still to be seen.

"The almost universal use of stucco in Greece has too often been overlooked. In early times it was usual to use inferior building materials, mud bricks, or rough kinds of stone, and to cover their surface wherever visible with a coat of stucco, which was frequently ornamented with frescoes or decoration of other kinds.

"This applies to all of the architectural members of early temples before the use of marble became prevalent, and even after, when marble could not be easily obtained. For houses it probably remained the custom as all times, as the walls were mostly of unbaked brick. The quality of the early Greek stucco is wonderfully fine. In early times, as far as we know, the stucco was always the thinnest coating, revealing the forms below, but in later Greek times examples of capitals of columns, bullheads, &c., are known to have been modeled or cast in this medium. The rough stone used by the Greeks was, like the Roman travertin, very porous and not capable of taking a fine surface, so they stuccoed it over, polished it, and sometimes decorated it with paintings. Traces of this are to be found in the Dorian monuments of Sicily, at Pæstum, &c."

The John Stewardson Memorial Scholarship in Architecture.

The twelfth competition has been awarded by the Managing Committee to Grant Miles Simon, an undergraduate of the School of Architecture at the University of Pennsylvania.

Five "mentions" were awarded, all to members of the University School of Architecture or its *atelier*, as follows:

First: Lucius Read White.
Second: Roy Childs Jones.
Third: Charles L. Bolton.
Fourth: George S. Koyl.
Fifth: Earl F. Bankes.

The jury consisted of Messrs. Edw. L. Tilton, Robert D. Kohn, John Mead Howells and John V. Van Pelt, all of New York.

The Stewardson Scholarship grants $1000 for a year's travel and study in Europe. It is open for competition to any person under 30 years of age who has studied or practiced architecture in the State of Pennsylvania for at least one year preceding the date of the final examination. In this year's competition 31 designs were entered from four *ateliers* (Pittsburgh, Wilkes-Barre, T-Square Club and the university *atelier* in Philadelphia) and from the School of Architecture, University of Pennsylvania.

The T-Square Club exhibition displays this year, as usual, the prize drawings of the Stewardson Scholarship for the previous year. It had hoped to exhibit also this year's drawings, but the decision of the committee could not be made in time.

Rapid Work in Factory Building.

Speed records in building are always interesting, not only to every one engaged in that particular line of business, but also to the public in general. Numerous instances might be cited where records have been broken in completing buildings of various kinds or constructing the steel skeleton framework of towering office buildings, and the list is now augmented by reports from St. Louis relating to a five-story factory building. The structure covers an area 55 x 300 ft., has a wing for engine and boiler house 28 x 200 ft., is built of brick and stone and is modern in all respects. The statement is made that the work of excavating was begun on February 10 and the building completed ready to turn over to the owner on April 24, the contract being completed 10 days ahead of time. At the commencement of the work there was a week's delay, owing to bad ground, and which added considerably to the cost of the work. The speed with which the factory was built is said to establish a record in St. Louis, but the bonus of $50 a day for every day the work was completed ahead of contract time acted as a strong incentive to the contractors. The work was done under the supervision of Clymer & Drischler, who also prepared the plans for the factory.

The annual meeting of the Cement Products' Exhibition Company was held May 11 at 115 Adams street, Chicago, when the following officers were chosen for the ensuing year: President, Edward M. Hagar; vice-president, Norman D. Fraser; secretary-treasurer, J. U. C. McDaniel.

CONTENTS.

Carpentry and Building

New York, July, 1909.

Farm Barn of Plank Frame Construction.

(With Supplemental Plate.)

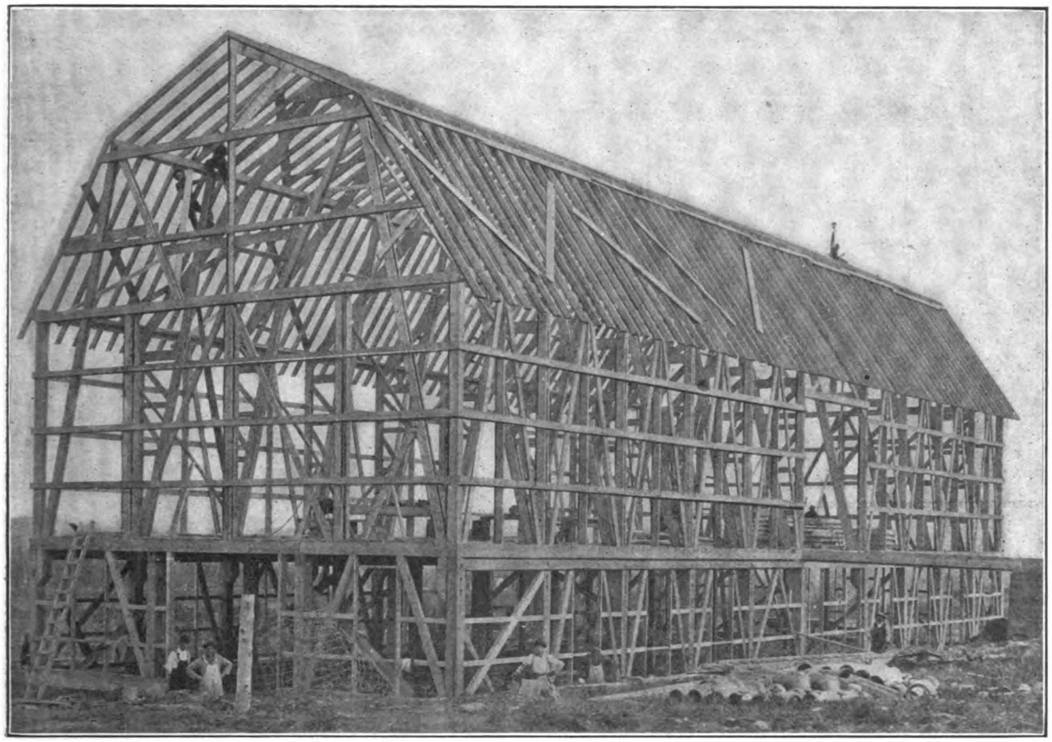
With building operations active in practically every section of the country, and especially in the rural and agricultural districts, where farmers have been busy making preparations for the proper housing of their crops at harvest, it may not be without interest to present at this time a description, with pictures and constructive details, of a large farm barn erected late in the fall of 1907 for the Eastern Maine Insane Hospital at Bangor, Maine. The half-tone pictures which constitute the basis of our supplemental plate represent the barn with the framing practically completed, and also the structure in a finished state ready for occupancy. The picture upon this page is another view of the framework of the barn ready to receive the outside covering.

The structure is 40 x 104 ft. in plan, with 18-ft. posts above a 10-ft. basement. The building sets just below and about 20 ft. from the edge of a bank, the latter being the division or boundary between two levels of land, one about 5 ft. to 8 ft. higher than the other, and both for some considerable area very nearly level. A bridge resting on a concrete abutment with wing walls approached by a road from the upper level slightly built up from it gives access to the main or first floor level for teams. This bridge, with a portion of the abutment, is readily noticeable from an inspection of the picture on this page, and is also shown in both pictures constituting the half-tone supplemental plate.

By this arrangement the entire basement is out of ground and the floor of it is but slightly above the grade of the lower level of the land. The basement is divided nearly in the center transversely, one-half being fitted up for a stable for farm horses, harness and grainroom, &c., &c., while the other half is used for a wagon and cart room. An examination of the plan presented in connection with the illustrations shows the basement arrangement in a very clear and comprehensive manner. The entire basement floor is of granolithic graded to catch basins. The plank floors of the stalls are laid on top of this granolithic surface.

The structure above the basement is built with a plank frame of the "Shawver System," and is intended for the storage of hay. Built in this manner there are no ties crossing the building to interfere with the use of a hay fork and the distribution of hay to all parts of the floor and almost up to the ridge, from the teams driven into the center of the floor by way of the road and bridge already mentioned. A modern hay fork operates on a track running longitudinally of the building and suspended from short collar beams about 2 ft. below the ridge. The storage capacity of the first story in loose hay is about 170 tons.

The entire barn is most thoroughly built, the foundation being a concrete trench wall well below frost line, while all the framework is of spruce, with the boards of the walls and roofs of planed and matched Norway pine, narrow, and laid with the planed side in. The entire frame of basement walls and first story is planed four sides, and the framework neatly done, thus making a

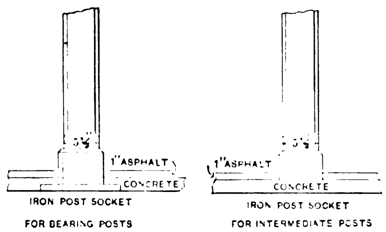


Perspective of Plank Framing Ready for the Outside Board Covering.

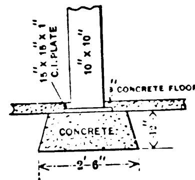
A Farm Barn of Plank Frame Construction.—Architects, J. C. and J. H. Stevens, Portland, Maine.

fine appearance in the stall and wagon rooms in the basement.

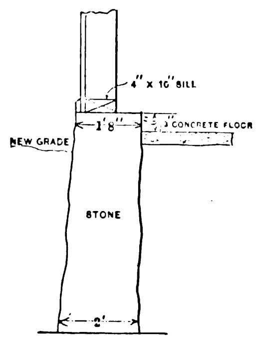
All outside finish, doors, windows and clapboards are of first-class pine. The roof is slated with No. 2 Black Monson Maine slate. The first story joists are covered with spruce plank planed one side to 1⅞ in. thickness and laid with the planed side down. Over this is a narrow matched spruce floor ⅞ in. thick laid diagonally.



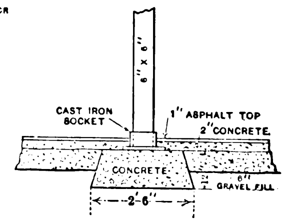
Scale, ½ In. to the Foot.



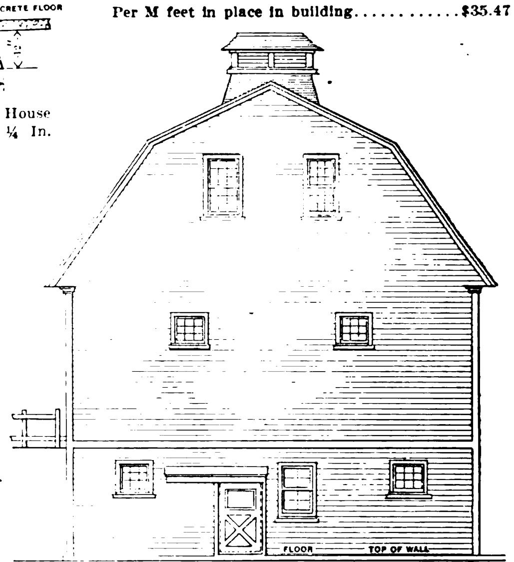
Detail of Wagon House Piers. — Scale, ¼ In. to the Foot.



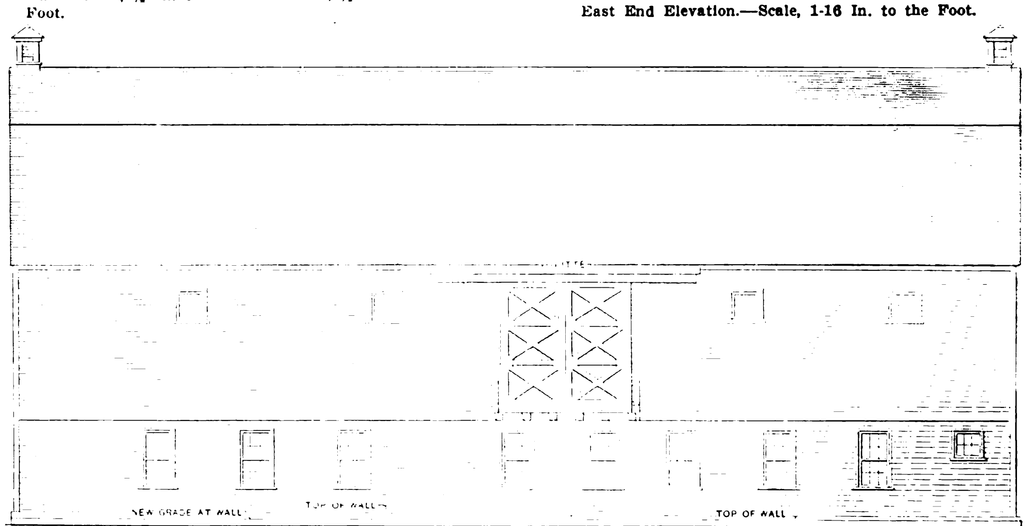
Section Through Foundation Wall.—Scale, ¼ In. to the Foot.



Detail of Stall Room Piers.—Scale, ¼ In. to the Foot.



East End Elevation.—Scale, 1-16 In. to the Foot.



South or Front Elevation.—Scale, 1-16 In. to the Foot.

A Farm Barn of Plank Frame Construction.—Elevations and Details.

The entire outside woodwork is painted two coats of lead and oil paint.

Work on the building was started September 12, 1907, and the entire contract was completed and the building accepted November 18, 1907. The pictures showing the framework of the barn completely erected and before the boards were put on were taken October 16, 1907. No attempt was made to hurry the work, as all of the crop of the institution farm for the year had been harvested before the building was commenced.

The architects of the barn were J. C. and J. H. Stevens, Portland, Maine, and the construction was carried out by Angus MacDonald & Co., 161 Devonshire street, Boston, Mass.

The total cost of the building was about $8000, and for the benefit of those who care for unit costs and analyses the following, prepared by Arthur W. Joslin of the firm of contractors and builders who did the work, may prove of interest:

Excavation, cost $0.2918 per cubic yard.
Foundations, concrete, $7.202 per cubic yard.

Spruce frame, per M feet:

Lumber, delivered at site	$22.91
Nails, delivered at site	1.00
Labor	11.56
Per M feet in place in building	$35.47

So little frame was under 2 x 6 in. that the item of "studding and furring" was not treated separately. All of this material was computed with the "frame."

Spruce and hemlock plank under floor, planed one side, per M feet, B. M.:

Lumber, delivered	$22.00
Nails, delivered	1.35
Labor	2.05
Per M in place in building	$25.40

Cost per square (100 sq. ft. surface), $6.06.

Matched spruce upper floor, laid diagonally:

Lumber, delivered	$22.00
Nails, delivered	1.10
Labor	8.30
Per M in place in building	$31.40

Cost per square, $3.63.
Matched Norway pine wall and roof covering:

Lumber, delivered	$22.00
Nails, delivered	1.13
Labor	7.41
Per M in place in building	$30.54

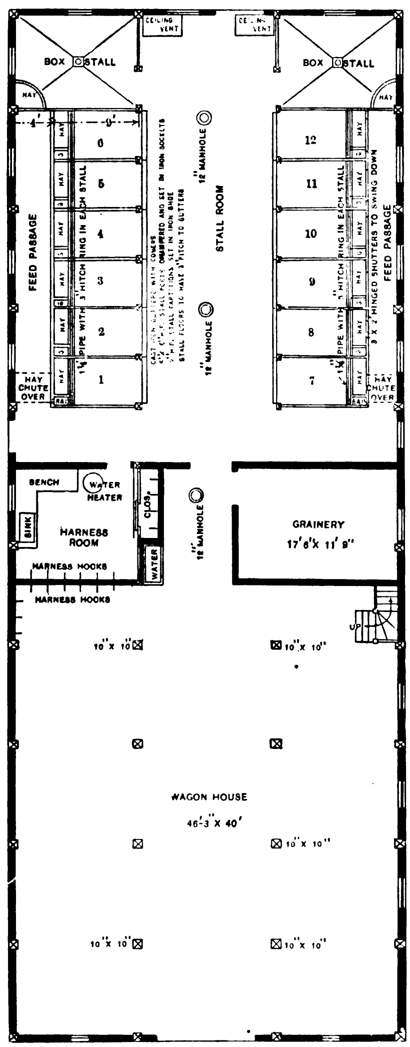
Cost per square, $3.279.
Above walls were boarded vertically.
Windows, average total cost:

Sash, frame and hardware, &c	$4.36
Labor	1.32
Cost of one window installed	$5.68

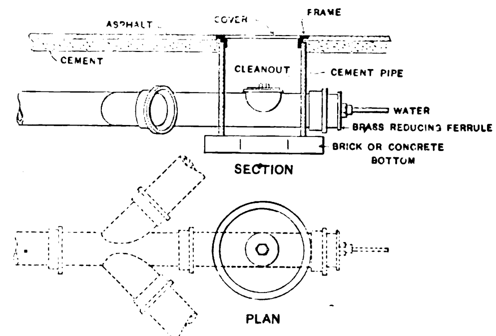
Sliding doors; 2¾-in. thick pine, hung on Coburn hangers.
Total square feet of surface of doors, 565.

Lumber milled and delivered	$0.3326
Hangers and other hardware	.097
Labor	.0884
Total cost per square foot of door	$0.488

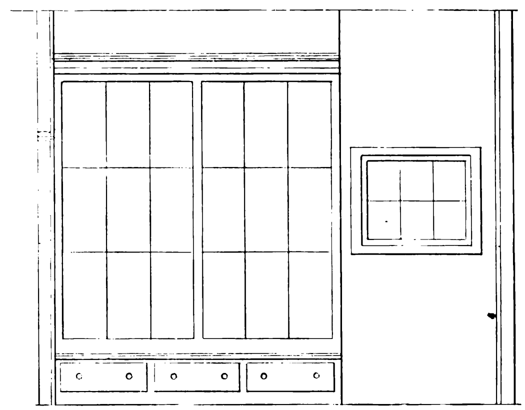
Most of the doors in the building were so large that it was impracticable to put them together in the shop, so material for them was completely milled and same was assembled on the job.



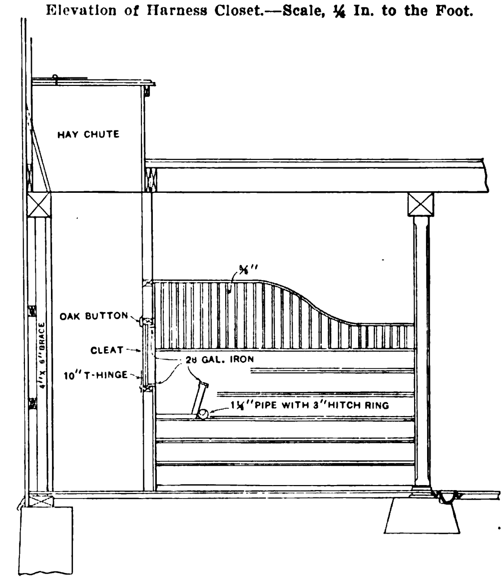
Basement or Ground Plan.—Scale, 1-16 In. to the Foot.



Details of Clean-Out at Rear Manhole Shown on Plan.—Scale, ½ In. to the Foot.



Elevation of Harness Closet.—Scale, ¼ In. to the Foot.



Vertical Longitudinal Section Through Stalls.—Scale, 3-16 In. to the Foot.

A Farm Barn of Plank Frame Construction.—Plan and Miscellaneous Details.

Clapboards; No. 2 pine, 4 in. to weather:

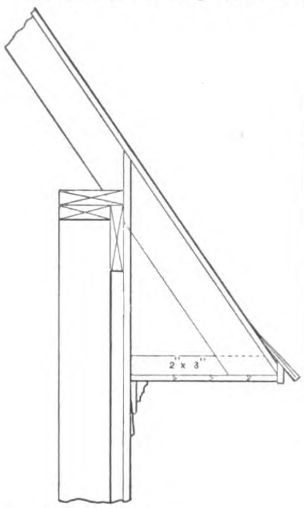
Clapboards and nails, delivered	$47.00
Labor	12.60
Per M in place on building	$59.60

Of course there were other items going to make up the total complete building, but the above are the principal ones and those in which carpenters will be most interested.

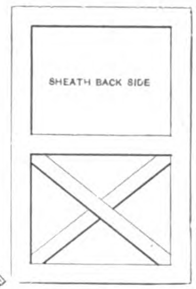
Among the group of buildings to be erected on the old Thompson estate in the Marion section of Jersey City, N. J., for the Lorillard Tobacco Company, and involving a total estimated outlay of about $1,000,000, are two structures which will be of brick, six stories each in hight, and will cover an area 100 x 250 ft. The factory, according to the plans of Architect John T. Rowland, Jr., will occupy 170 city lots, and will be constructed of steel and brick. The chief engineer of the work is F. L. Francisco, 111 Fifth avenue, Borough of Manhattan, N. Y.

Materials for a Modern Apartment House.

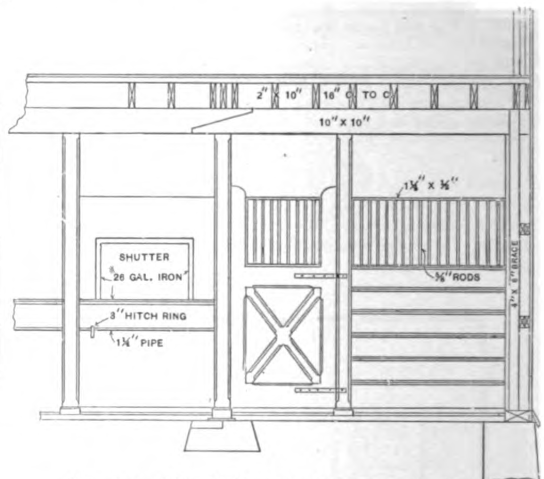
An idea of the magnitude of some of the mammoth apartment houses recently under construction may be gained from the following statistics relating to the "Belnord," now in course of erection on the square bounded by Broadway, Amsterdam avenue, Eighty-sixth and Eighty-seventh streets, Borough of Manhattan, N. Y. Among other materials, 7,000,000 brick will be required; 30,000 cu. ft. of stone, 85,000 ft. of steam pipe, 1600 radiators, which will be supplied by four steam boilers; 10 miles of window chain, 84 tons of sash weights, and 150,000 sq. ft. of glass for 2790 windows. The building will require 9000 ordinary door hinges, 12,000 smaller hinges for cupboards, drawers, &c.; 11,100 window pul-



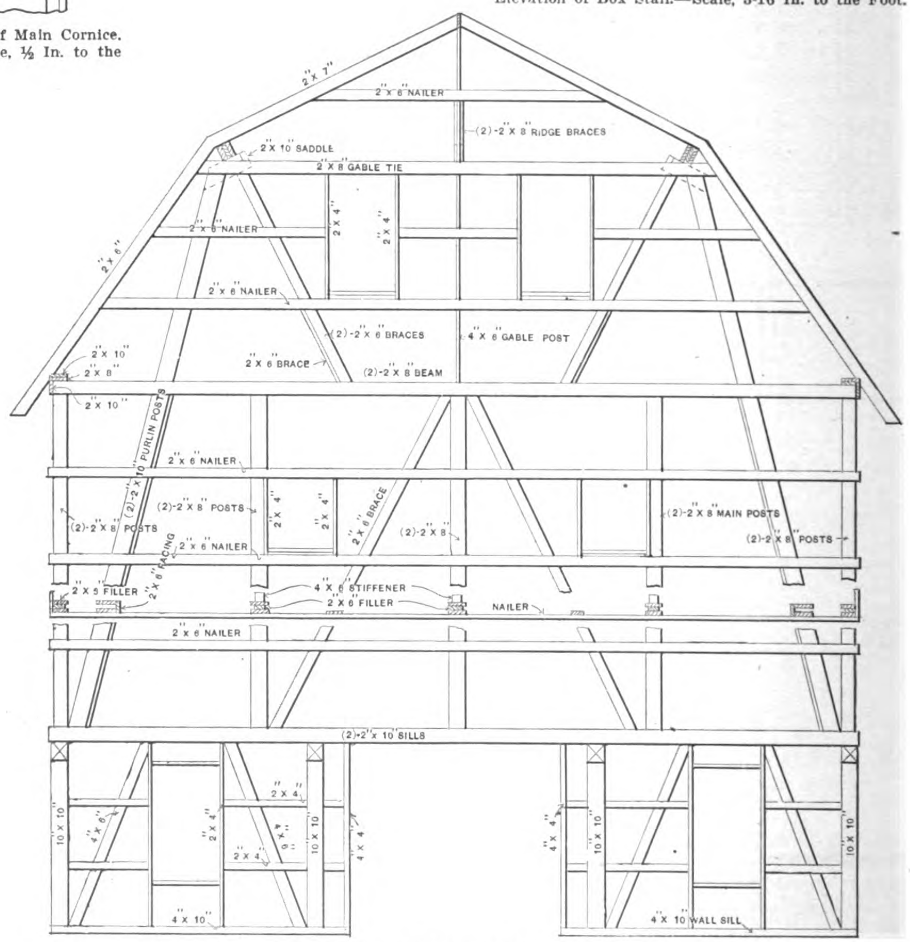
Detail of Main Cornice. —Scale, ½ In. to the Foot.



Elevation of Inside Doors.—Scale, ¼ In. to the Foot.



Elevation of Box Stall.—Scale, 3-16 In. to the Foot.



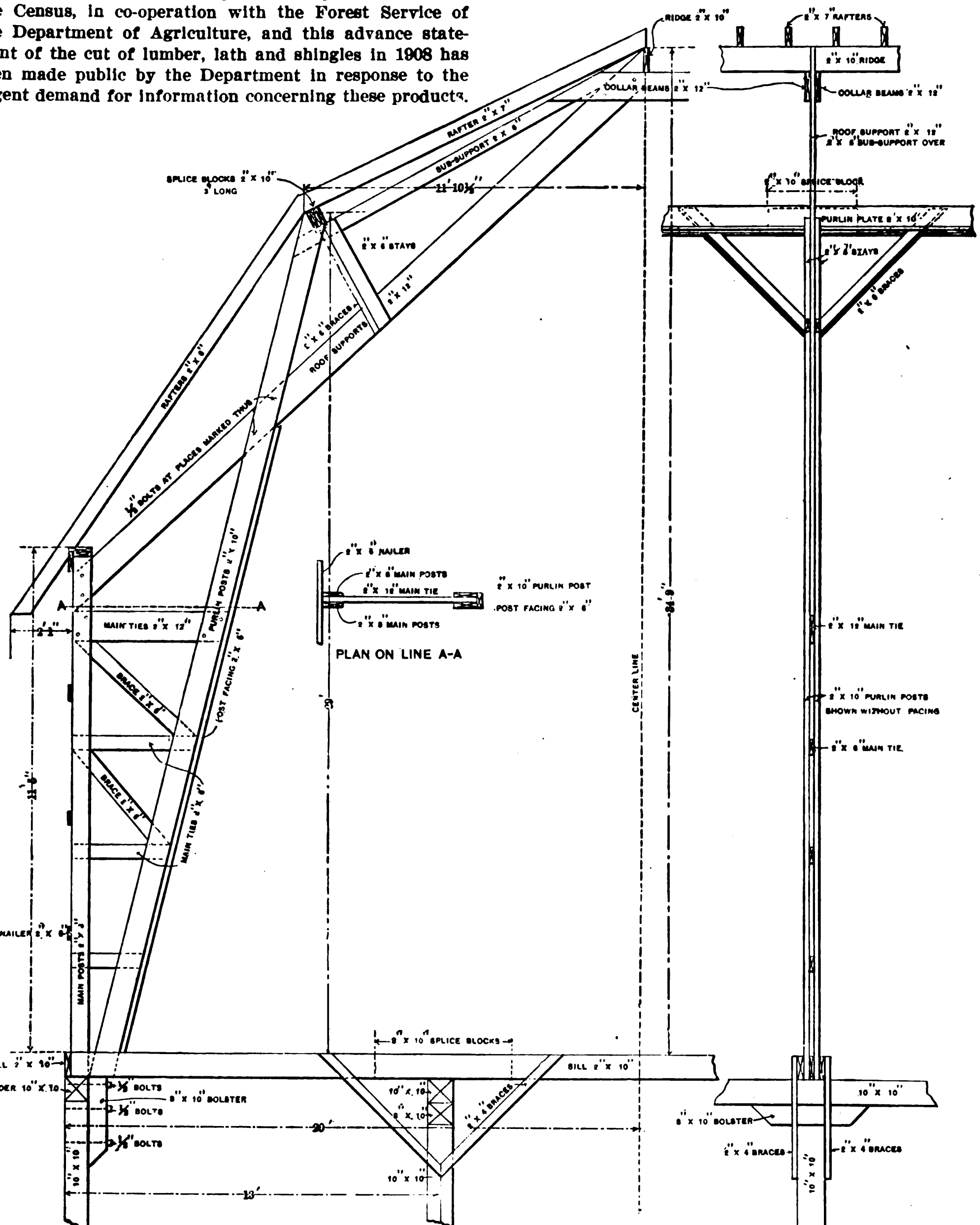
West End Elevation, Showing Framing.—Scale, ⅛ In. to the Foot.

Miscellaneous Details of a Farm Barn of Plank Frame Construction.

leys, 47,000 hooks in clothes closets, 400 Yale locks, 3650 ordinary locks and 9486 knobs of various kinds.

Production of Lumber, Lath and Shingles in 1908.

Statistics relative to the production of forest products are annually collected and published by the Bureau of the Census, in co-operation with the Forest Service of the Department of Agriculture, and this advance statement of the cut of lumber, lath and shingles in 1908 has been made public by the Department in response to the urgent demand for information concerning these products.



Details of Truss Construction.—Scale, 3-16 In. to the Foot.

A Farm Barn of Plank Frame Construction.

The statistics for New York were collected by the New York State Forest, Fish and Game Commission.

As indicated by the figures, a falling off in production from 1907 of 17.3 per cent. occurred in 1908, or from 40,256,154 thousand feet, board measure, to 33,289,369 thousand feet, board measure, and this, despite the fact that the canvass for the latter year was even closer than for the former—the cut of 31,231 mills having been included as against 28,850 mills. While practically every section of the country shared in the decrease, it was most marked in the centers of heaviest production—the Pacific Coast and certain parts of the yellow pine belt.

Yellow pine, Douglas fir, white pine, hemlock, oak and spruce, in the order named, were the species cut in largest quantity, though the clearly defined trend during recent years to a relatively increased production of other and less abundant woods continued.

The shingle production in 1908 was 12,106,483,000 as against 11,842,196,000 in 1907. Among the States Washington led with 60.2 per cent. of the total in the later year, Michigan, Louisiana, Maine and California following with 7.5 per cent., 5.5 per cent., 3.9 per cent., and 3.8 per cent., respectively.

The cut of lath, like lumber, showed a decrease from that of the preceding year, being 2,986,684,000 as against 3,663,602,000.

RAISING A 3000-TON CHURCH BUILDING.

WE have at intervals in the past referred to unusual feats in the way of raising and moving massive buildings of various kinds, pointing out the successful methods employed in accomplishing the work, ranging as it did all the way from the ordinary five-story brick tenement house to a masonry church edifice 93 x 161 ft. in plan, with the main body rising to a hight of about 100 ft. and having a 24-ft. square tower rising to a hight of 225 ft. The approximate weight of the building was 6650 tons, including the tower, the latter weighing approximately 1420 tons. A striking feature in connection with this church moving operation was that the contractor was under heavy bonds not to injure any part of the structure, and to replace any part of it if by accident some of the masonry should have fallen while the work was in progress.

Raising a Brick Church.

Another interesting operation in connection with a church edifice, but which simply called for the raising of the building 5 ft., is that of a brick church in Galveston, Texas, located on a street corner and covering an area 64 x 139 ft. The church was about 40 ft. high from the ground to the peak of the roof, and was surmounted by a tower 13½ ft. square and 70 ft. in hight. There were in the nave 12 brick columns nearly 5 ft. in diameter at the base, carrying Gothic arches of solid brick masonry 18 in. thick, supporting the roof arches and clerestory walls about 25 ft. above the floor. The manner of accomplishing the work, which was done under the direction of Harvey Sheeler, engineer, who, by the way, was in charge of the church moving operation above referred to, is described in a recent issue of the *Engineering Record*, and is of such general interest to our readers that we present the following particulars:

There are no interior partitions, and the wooden floor is carried on beams supported by brick piers about 12 ft. apart on centers. The walls of the tower are 3 ft. thick, and the other walls are 18 in. thick, all having stone foundations just below the surface of the sandy soil. The floor is about 3 ft. above the surface of the ground, and the main walls are 25 ft. high above the floor, and on each long side are made up of exterior buttresses and high double windows, which greatly weaken the walls.

On account of the tidal wave which did so much damage to Galveston a few years ago, it has been deemed necessary to raise the grade of some of the finished streets several feet, which involved raising the church 5 ft. About one-half of the tower had been blown down in a severe windstorm and rebuilt, and other portions of the church were so seriously damaged by the same storm that, on account of these injuries, the large dimensions, lack of structural bracing and general weakness of the building, it was considered very difficult and hazardous to attempt to raise it, and it was believed by many to be impossible.

There was no basement under the church, and as there was only about 18 in. clearance below the floor, where a minimum headway of 4 ft. was required for the prosecution of the work, it was necessary to excavate there to secure working space. Trenches about 6 ft. wide were dug on both sides of the main walls and around the piers to a depth of about 2 ft. below their footings. Thus all of the work was carried on outside the church and under the floor without the necessity of entering or disturbing in any way the interior.

Continuous grillages of timbers were placed in the bottom of the wall trenches. On these were placed screw planks and 20-ton jack screws about 2 ft. apart. A continuous line of longitudinal 12 x 12 in. timbers in 20-ft. lengths were set on top of the jack screws for the full length of the building on each side of the wall. The two lines were about 8 ft. apart on centers and supported single 12 x 12 in. transverse horizontal timbers, passing through holes cut in the wall just below the water table under each buttress and 8 ft. apart in the centers of panels between buttresses. At the buttresses pairs of timbers 26 ft. long were carried through the wall and also supported the interior columns.

Inside and outside of the tower excavations were made 2 ft. below the footings, and the bottoms of the trenches were covered with continuous grillages bearing 240 20-ton jack screws about 6 ft. clear of the face of the wall. On these jack screws were seated sets of three transverse I-beam needles inserted in holes cut through the wall about 3 ft. above the bottom of the foundations.

The total weight of the church, including tower, is estimated to be about 3000 tons, which was carried on 900 jack screws.

Operating the Jack Screws.

When everything was in readiness the jack screws were operated by about 100 men stationed at one longitudinal wall and the tower, who turned the screws simultaneously one complete revolution, and then proceeded to the next longitudinal row of screws and repeated the operation at a given signal, operating the screws on the seven main lines of cribbing simultaneously in successive movements, each of which required about 1 min. The church was thus raised about ½ in. uniformly in 10 min., and the men returned in reverse manner to the starting point, raising the church an average of 1 ft. per day.

The jacks were removed and replaced on new supports every 12 in. in hight. After the building was raised to the required hight, concrete foundations were built on the old footings, the weight of the walls was transferred to them, and the needle beams, jacks and cribbing were removed, completing the work in about 35 working days.

The work was accomplished without cracking the main walls, injuring the decorations or causing any other perceptible damage to the building, and it was carried on without interfering with the use of the church, services not being discontinued at any time while the work was in progress. While the building was supported on jack screws services were attended by the largest congregation on record.

Depositing Concrete from a Hight.

So much has been said with regard to the hight from which it is safe to deposit concrete in doing various kinds of work that the following particulars furnished that journal by a correspondent of the *Engineering Record* cannot fail to prove of general interest, and especially to those having occasion to execute concrete work of various kinds:

Not long ago I worked on a job where the concrete was dropped 35 ft. No pipe was used. The material was delivered in buckets by derricks and simply dumped into place from the top of the forms. By examining the completed work it was not possible to tell which concrete had been dropped 35 ft. and which 5 ft. I am now employed on a job where the specifications state that no concrete shall be dropped more than 3 ft. As the work progressed it became evident that we could not comply with that clause. Accordingly, the distance was increased until now we are dropping concrete 28 ft. and the engineer is well pleased with the results.

I wish to call attention to a reinforced concrete water tank built at Little Falls, N. J., by W. B. Fuller. This structure is 43 ft. high and 10 ft. inside diameter. The walls are 15 in. thick at the bottom and 10 in. thick at the top. The tank was built in 8 hr., and is a perfect monolith, all concrete being dropped from the top, or 43 ft. at the beginning. The concrete was mixed very wet, the mixture being 1 part cement, 3 parts sand and 7 parts broken stone. No plastering or waterproofing of any kind was used, but the tank was found to be absolutely water tight.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—VI.

BY EDWARD H. CRUSSELL.

THE method of cleaning off our counter top will depend somewhat upon the size of it. Wherever possible it is generally better to straighten the bottom side and the edges and fasten it in place before trying to dress off the top. Where it is not possible to do this and the top shows a tendency to curl or warp two or three stout cleats may be temporarily fastened to the under side of it, but even then the final smoothing off should be left until the top has been fastened in place.

To make a good job of the cleaning off, the planes must be in good condition and the plane irons kept sharp. An iron jack plane is preferred by the writer for the first part of the job, especially for hardwood. First get rid of any glue there may be on the face of the work and then commence to level the surface of the top by planing it crossways of the grain, not exactly square across, but at an angle of about 80 degrees. This is the quickest method of reducing the top to a level surface, but the plane must be kept very sharp and not have "too much iron," as it is liable to tear out the fibers of the wood and make the final cleaning up a much longer process.

After planing crossways until every part of the surface has been touched with the iron, finish off lengthways with the trying plane and smooth plane, using sandpaper on soft wood and a steel scraper on hard wood for the final finishing off.

The sandpaper and scraper are used for removing the plane marks which may not be noticeable when the wood is in the white, but which will surely show up after it has been painted or varnished, no matter how carefully the planing has been done.

The molding on the edges of the counter should be worked before this final scraping or papering. A nosing is most commonly used, and it may be either a full semicircle as in Fig. 24 or a segment as in Fig. 25. The segment is the easier to work and in most cases looks better. Figs. 26 and 27 show two other styles of edge molding, both of which are easy to make and require no tools other than those usually found in the carpenter's "kit."

Figs. 28 to 34, inclusive, show various methods of fastening such work as counter or table tops. In Fig. 28 the fastening is by means of screws in countersunk holes, which are afterward filled with plugs of wood of the same kind as the counter top and having the grain run the same way. Plug cutters may be purchased that will make these plugs to perfection, although it is possible to make them without any special tool. To make them one at a time would be quite a job, but if we cut a small strip from the end of a board 6 or 8 in. wide it is quite easy with a finely set plane to reduce this strip to a cylindrical form in the same manner as if the grain ran lengthways instead of across it. The ends of the strip will chip a little, of course, but there will be a number of good plugs in the center of the piece.

When boring the holes for the screw heads it is better to measure than to guess at the size of them. Screw holes are larger than they look to be, and forcing one through a hole a trifle too small for it will mar the edges of the hole, so that the plugs will not properly fit.

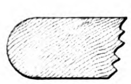


Fig. 24.

Fig. 25.

Fig. 26.

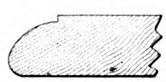


Fig. 27.

Various Styles of Edge Moldings.

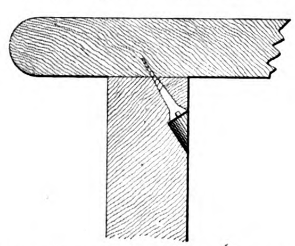


Fig. 29.—Method of Fastening with Screws from the Under Side.

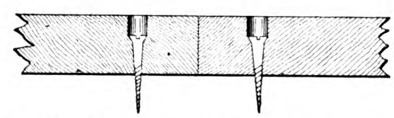


Fig. 28.—One Method of Fastening Counter Top.

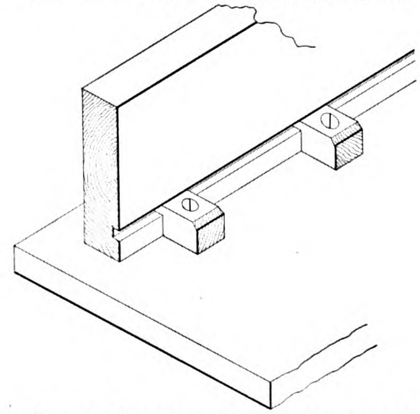


Fig. 30.—Fastening Top so as to Allow for Swelling or Shrinking.

The Jobbing Carpenter and Some of His Work.—VI.

In Fig. 29 is shown a method of fastening with screws from the under side. The easiest way to work this is to first bore the holes for the screws from the upper edge of the framing and cut the recess for the head afterward. Owing to the manner in which the screw enters, it is well to hold the pieces together with hand screws or clamps while making this fastening.

A method of fastening the top which allows it to swell or shrink without splitting or breaking the joints is illustrated in Fig. 30. A groove, or in some cases a rabbet, is plowed on the inner sides of the framework and the top is fixed with screws and small pieces of rabbeted wood called "buttons" that fit into the groove. In making the buttons it is quicker to cut the rabbet across the end of a wide piece of board, bore all the holes for the screws and thus make several at once, as indicated in Fig. 31.

The method presented in Fig. 32 will also allow the

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—EDITOR *Carpentry and Building.*

top to swell or shrink. In it a strip of wood is fastened firmly to the framework with screws or nails, and the top is fastened to this strip by means of screws passed through slotted holes. Round headed screws are used, with a small washer under the head to enable them to move readily.

A modification of this fixture is shown in Fig. 33, in which the strip is made wider and fixed on top of the framework while the screws are placed alternately on each side. The writer has used this latter form quite successfully in the construction of large drawing boards.

It will be noticed that Figs. 30 and 32 are represented as being upside down, which suggests the remark that wherever possible upside down is the proper way to fix such work as that under consideration. Quite often the writer has seen men crawling around on the floor under some small table or stand working the screw driver with one hand and holding the piece in position with the other, while the whole thing might have easily been turned upside down on a couple of saw horses and worked upon with comfort.

A fastening which though hardly strong enough for erected to some other one it will probably be necessary to cut them into sections. Before doing this it will be well to go over the ground thoroughly, both at the old and new locations, so as to be certain everything has been figured out to the best advantage before commencing work.

Take note of everything that is likely to be in the way or cause trouble, such as doorways, staircases, &c., and it is a good idea to use rods cut to the proper length for measurements, unless you are very sure of yourself and never make mistakes.

If the counter is very firmly nailed down, which it is likely to be if built in place, a number of wide thin wedges driven beneath it at or near the supports will in most cases start it going. It is often necessary to fasten temporary pieces to the counter in order to brace it and hold the various parts together, and seeing that the nails which fasten it to the floor must come out some time, it is best to remove them as early as possible before they can do damage to the floors or floor covering. Pieces of gas pipe or even pieces of broom handle used as rollers will assist in adjusting the counter to its final position.

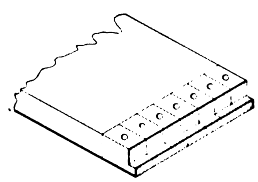


Fig. 31.—Making Several "Buttons" at One Operation.

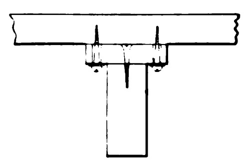


Fig. 33.—A Modification of the Fixture Shown in Fig. 32.

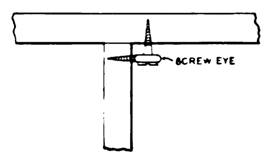


Fig. 34.—A Fastening for Lighter Work.

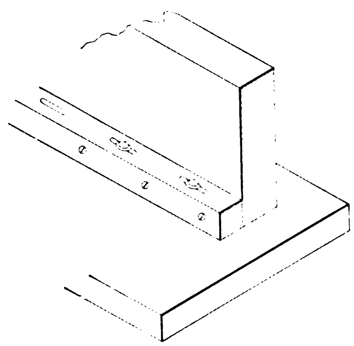


Fig. 32.—Another Method of Fastening so as to Permit of Shrinkage or Swelling.

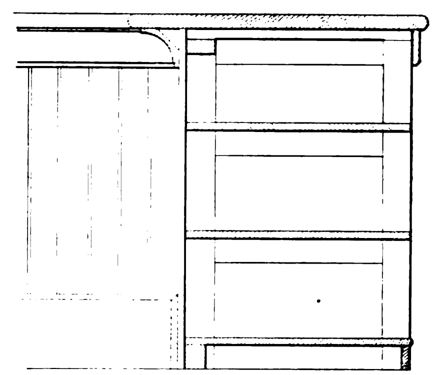


Fig. 35.—A Simple Design for Plain Work—Elevation and Section of a Counter that Can Be Built of Ordinary Stock.

The Jobbing Carpenter and Some of His Work.—VI.

a counter top can be used quite handily for a number of different purposes, such as light table tops, stands or shelving, is illustrated in Fig. 34. It consists of a stout screweye fixed in the framing with a wood screw passed through it into the table top or shelf.

We have already stated that for work of any importance the mechanic would most probably have a design furnished him, but a simple design for plain work is given in Fig. 35, which represents the front elevation and cross section of a counter that can be built of the ordinary stock usually found in a jobbing shop. A large sprung molding gives the necessary overhand to the top. The front is of beaded ceiling, and a bevel edged board forms the base at the bottom. The framework is of 2 x 3 in. dressed material, and the space under the counter may be fitted with either drawers, cupboards or open shelving, according to requirements.

In the matter of moving such fixtures as counters from one place to another, the writer finds it rather difficult to set forth any general information. Counters that have been put together in the factory will present no great difficulties, as, of course, they have been brought to the store in sections and can be taken away in the same manner. Counters that have been built in place, however, are usually much longer and heavier, and if they are to be taken from the building in which they were

In the next installment we shall explain the making of a cash till, going somewhat thoroughly into the matter of dovetailing and other items, which a description of a job of this kind will entail.

Brick Temple 6,400 Years Old.

The oldest temple in the world, so far discovered, has been unearthed by excavators at Bisya, in central Babylonia. The walls of the tower were first uncovered and the summit cleared. The first inscription on the surface was on a brick stamped with the name Dungi, which goes back to 2750 B. C. A little lower appeared a crumpled piece of gold with the name Param Sim, who lived in 3750 B. C. Just below were large square bricks peculiar to the reign of Sargon, 3800 B. C., and who was probably the first Semitic king of Babylonia.

A large platform was discovered 2½ yd. below the surface, which was constructed of peculiar convex bricks such as were used in building 4500 B. C.

Among the building improvements projected in the suburban sections of Greater New York may be mentioned 15 two-family dwellings, each one of which will cost about $7,000, in West Orange, N. J.

A New Method of Reinforced Concrete House Construction.

THE rapidly growing popularity of concrete in connection with various forms of construction and the extent to which it is now being used throughout the country in connection with buildings of all kinds lends added interest to a description of a reinforced concrete house built by an entirely new method of construction. This form of fireproof construction embodies the use of steel tubing, wire, malleable fittings and concrete, but with the exception of the piers the concrete is not depended upon to carry any of the load, being used only as a stiffener or body to the building.

The entire framework can be erected before the concrete work is commenced, making it possible to inspect the position and quality of the steel and to erect a building in a much shorter time than would otherwise be the case. No forms or centering are required, which is, of course, a decided advantage. The walls and floors are hollow, which reduces the weight of the building to the minimum and affords an excellent insulation. The strain tend down to the basement floor and rest on concrete piers or footings, which were the only foundation required. None of the pipes were threaded, but were put together with a special malleable fitting which was bolted through the column and girder. A number of different fittings have been devised, but in the construction of this building only one type of fitting was required, and this was an angle cast in malleable iron concave on the side next to the pipe. These fittings were bolted onto the girders in the shop and the girders were then poured full of concrete, and after the frame was erected the columns were filled with concrete, so that all bolts are cemented in position and the interior of the pipe is protected against corrosion. A frame of this kind can be set up with common labor, and in a remarkably short time, as the only work is to hoist the pipe into position and bolt it together. The strength of the pipe is greatly increased by being filled with concrete, and in the construction of this building it was found that the frame

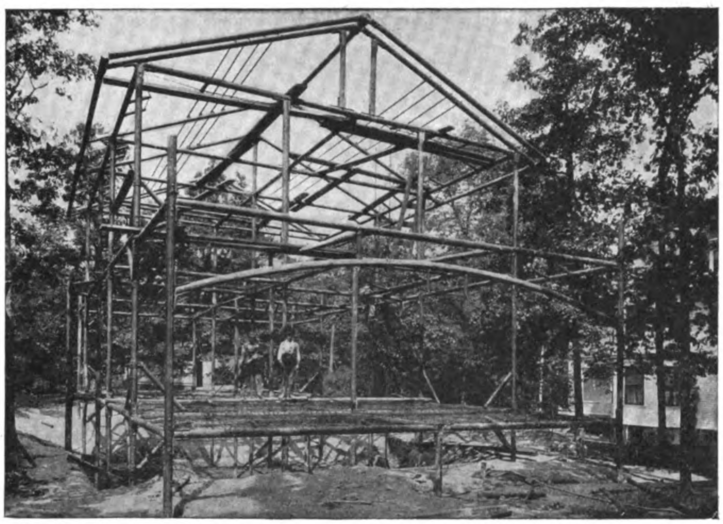


Fig. 1.—View of Skeleton Frame Made of Steel Tubing.

New Method of Reinforced Concrete House Construction.—Architect M. J. Moorehouse, Chicago, Ill.

on the floors is carried by wire in tension, and tests have shown that an equal amount of steel used in this way renders a floor of nearly double the strength it would otherwise possess. The floors, walls and paritions form one integral mass, thus rendering the building practically indestructible and vermin proof.

The claim is made that a building constructed in the manner hereafter described is absolutely fireproof and costs but very little more than the present form of brick walls, wood floors and partitions. All steel and wire is incased in cement, which prevents corrosion or rust, and the exterior is of cement mortar, which permits of any finish or form of ornamentation desired.

The first building in which this form of construction was used has recently been completed at the corner of Sheridan road and Central avenue, Glencoe, Ill., in accordance with plans prepared by Architect M. J. Moorehouse, 2117 Fisher Building, Chicago, Ill. The description which follows and the half-tone illustrations which accompany it are taken from the Universal Portland Cement Company's Bulletin No. 60. This residence is elaborately finished, and every possible feature of construction is here demonstrated. The accompanying engravings show the residence in the different stages of its completion.

A skeleton of steel tubing was first erected, as shown in Fig. 1 of the half-tone illustrations, all the pipe being cut to length and drilled in the shop. The columns ex-

was so rigid that no bracing was required, although a system of diagonal bracing was originally planned.

After the pipe frame was completed a system of horizontal trusses was constructed around the outside of the building on a level with the floors, Fig. 2, which formed an incompressible framework upon which to draw the floor wires. These trusses were constructed by wrapping the wire around the columns and driving in short pieces of pipe for struts. This method of trussing is very strong and easily applied. The same method of trussing is used under the girders, where especially heavy loads occur, and any desired strength can be obtained by using a sufficient number of wires.

After the truss wires were in place, wire was drawn around the girders in both directions, either the entire length of the structure or in such sections as desired, and these wires attached end to end with a specially devised coupler. This process gives a continuous wire stretched around the girders, drawn under a tension of nearly 1000 lb. and left free to adjust itself to the strain as applied. For this purpose No. 0 to No. 3 wire is used, wound as close as required for the strength of the floor. The side walls were wound in the same manner and the window frames were attached to the wires with the same couplers used for joining the floor wires. The walls of each story were wound separately, so that it is impossible for a girder to deflect, as each girder hangs from the girder above, and is supported its entire length. Expanded metal or wire cloth was placed under the top wires of the floor and was tied to these wires with specially designed clips; this wire cloth served only as a medium to hold the concrete until it had hardened. The wires at this stage of the construction were very stiff and the floor could be walked on, and for wheeling the concrete only a single plank was required.

The concrete was dumped or shoveled onto this floor mattress and leveled off to an even surface, as shown in Fig. 3. As the fresh concrete was placed the weight deflected the floor wires and, as they were wound continuous, they slipped over the girders and drew the under wires to a high tension with practically the same strain on every wire. When the concrete hardened each of the upper wires was thoroughly covered with concrete, and the under wires, carrying the ceiling, were perfectly straight. Expanded metal or wire cloth was then applied to the under wires and the plaster was put on the ceiling in the usual way. Floors 3 in. thick and with spans from 14 to 16 ft. were successfully constructed in this manner.

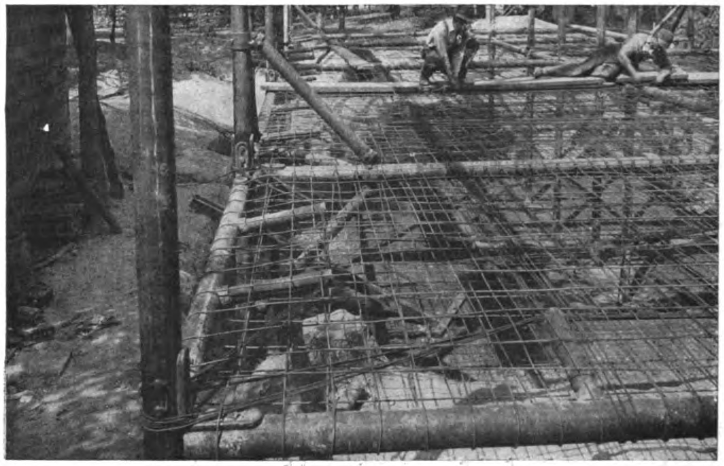


Fig. 2.—Showing the Horizontal Truss System.

The outside walls were formed by applying wire cloth to the vertical wires, as above mentioned, and the plaster was put on the same as in any other form of cement plaster finish. Fig. 4 shows the house at the stage of construction where cement plaster is being applied to the outside walls. Where hollow inside partitions were used, they were formed similar to the outside walls, but light, solid partitions can be constructed with this method. Where partitions were to run, a horizontal wire was stretched in the floor before the concrete was placed and vertical wires were suspended from this one about 10 in. on centers. After the concrete was placed on the upper floor, these wires were attached to the wires in the lower floor, so that when the concrete was put on this floor the weight of the floor stretched the partition wires; wire cloth was then attached to these vertical wires and the partition was plastered in the usual way. The roof was constructed in the same manner as the floors and the finished cement surface was left exposed. This roof was finished with a float and has stood throughout the entire winter and spring, and no leaks have developed. In Fig. 5 is shown a view of the house completed.

Universal Portland cement was used exclusively in this building. The concrete for the floors was composed of one part cement, three parts lake sand and five parts gravel; the roof was composed of the same concrete, on which was placed a ¾-in. covering of mortar composed of one part cement, three parts sand and finished with a wooden trowel. The walls, inside and outside, and the partitions were covered with Portland cement plaster; the outer walls were given two coats of plaster composed of one part Universal Portland cement (1 bag), three parts of sand (3 cu. ft.), hair to the amount of ½ bushel per barrel cement was mixed with the sand. The exterior was finished with a pebble dash composed of one part cement and two and one-half parts coarse sand and gravel which passed a ⅜-in. screen and was retained on a ⅛-in. screen.

The residence is complete with plumbing, hot water heating and electric wiring, all of which were installed without difficulty.

With the exception of interior trim, no wood was used in the construction, as all exterior moldings and ornament were formed of cement, cast on the ground and wired in place before the plastering was done.

The construction work was carried out by G. A. E. Kohler of Kohler Brothers, Fisher Building, Chicago, Ill.

Finishing Plastered Walls at Moderate Cost.

In the case of a new house the owner of which did not wish to paper the walls or ceilings of the rooms and hallways, a correspondent of the *Painters' Magazine* asks of that journal what would be the best finish at moderate cost to use and what color schemes would be best for the purpose. The owner of the house, he points out, wants a finish that will not readily rub off, as he has a large family of children. In reply the journal in question says:

Fig. 3.—Placing the Concrete on the Floor.

If the family is occupying the premises it will be best to finish the walls and ceilings in kalsomine or distemper. Kalsomining will be least expensive, besides being least offensive to the occupants. You can either prepare your own kalsomine or purchase one of the washable water paints. These you can obtain in white and many tints, as well as stronger colors, and it will save the trouble of mixing the tints. All you have to do is to follow the directions given on the packages.

If, however, you prefer to use kalsomine you can prepare it by mixing 30 lb. of bolted gilders' whiting with enough water to make a soft batter, letting it stand over night. Also soak 1 lb. of white sheet glue or gelatine over night, then boil in a hot water bath and add it to the whiting, beating the mixture until all lumps have disappeared. This mixture, when properly thinned with

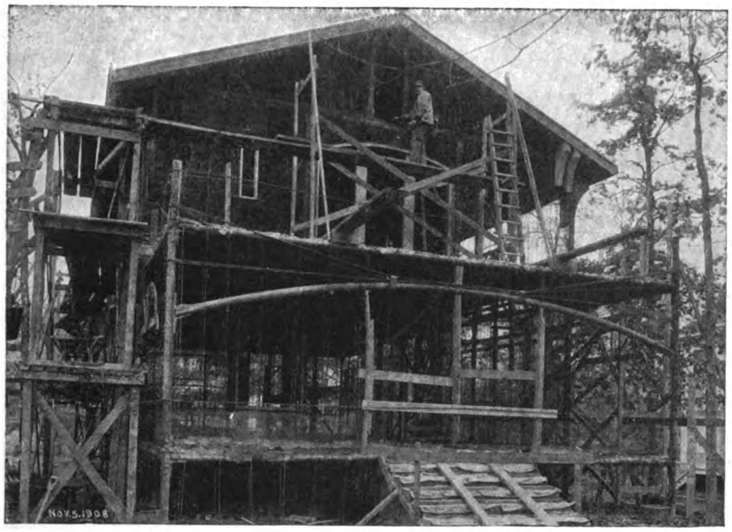


Fig. 4.—Applying the Cement Plaster on the Outside Walls.

water, constitutes kalsomine and may be tinted to suit the taste with colors that are alkali proof, such as ultramarine blue, yellow ocher, raw or burnt sienna, raw or burnt umber, Indian red, Venetian red, lampblack, ivory black, rose pink, Bremen blue, Bremen green and zinc yellow or any mixture of these.

As to the proper tints to be used for the various rooms very much depends upon the sizes of the same and the use to which they are put. As to the hallways, the light should be considered. The walls of a kitchen might be finished in pearl gray or in buff, with the ceiling to correspond in tint, but, of course, much lighter. The walls of a moderate sized dining room might be a delicate sea green tint with ceiling just white tinged with green. Or if the room is well lighted the walls might be a dull green or terra cotta with ivory ceiling. A sitting room might have a tint of light tan on the upper third of the walls, with a dark tan lower wall, separated by a picture molding, and a ceiling of white, lightly tinged with the tan used on the walls. Bedroom walls should be kept fairly light pale blue or pale rose, peach blow or ivory or deep cream tints being most suitable; with white ceilings faintly tinged with the color used on the walls. Walls of hallways are best in two colors, the lower portion being considerably darker than the upper part, and chocolate tints, dull or gray green, drabs, buffs, fawn, tan and light grays are quite suitable in halls where the walls are plastered and not wainscoted. If the latter, then the plaster portion should be painted to harmonize with the color of the wood. The taste or desire of the owner, of course, must govern in the selection of the tints or colors.

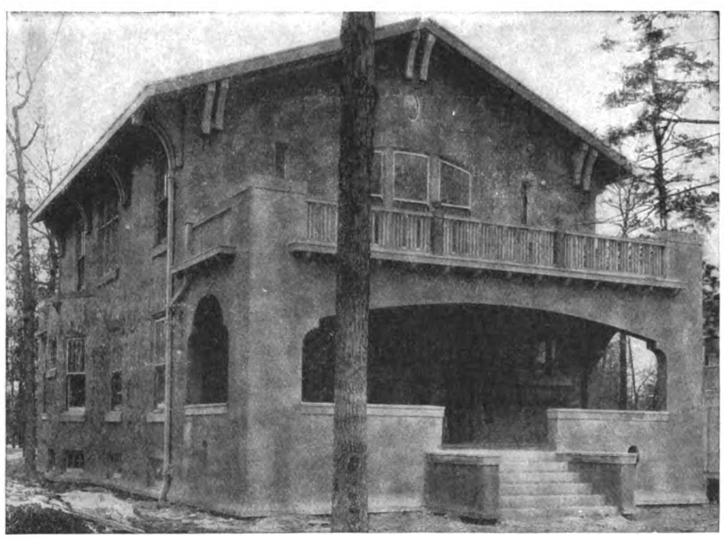


Fig. 5.—A View of the Completed House.

WHAT is said to be the largest contract for high-grade face brick ever awarded to a Philadelphia concern or for Philadelphia use is that for the light gray impervious brick to be used for the interior of the new office and publishing house to be erected for the proprietors of the *Ladies' Home Journal.* The order involves 2,250,000 high-grade brick of a very light, delicate color. The architect of the building is Edgar V. Seeler.

Artistic Treatment of Architectural Drawings.

It is surprising what a number of architectural drawings—especially perspectives—are spoiled for want of artistic treatment, by bad judgment in the management of light and shade, figures drawn badly and out of scale, impossible trees and general accessories all wrong, says a writer in a recent issue of *London Studio.* Some architects, whose work is otherwise splendid, will put in absurd little figures, apparently with an idea to enhance the hight of their buildings. And when the building is completed, one often notices a chance natural effect of light and shade, whereas, had the perspective been drawn by an artist familiar with these effects, a fine result would have been obtained, as well as a drawing worth keeping as a work of art.

Special "features" of a building often require prominence, and this can only be done by keeping the surroundings quiet; but only an artist will understand how to do this. One has only to see the exhibition of architectural drawings at the Academy any year to see how insipid and wanting in artistic treatment most of the perspectives appear. The general average is "stodgy," with what is known as the "Academy treatment." There are a few architects who treat drawings very finely, but they are the rare exceptions. It seems a pity that many excellent designs are spoiled or fail to have justice done to them for want of artistic management. Architects generally suppose that an artist would spoil their details, but this is not so where proper judgment is considered and an artist of proved ability given the work to do. It is to be hoped that the subject will receive the careful attention which its merits would seem to deserve to the end that better results will be reached.

PRIZE WINNERS IN BUNGALOW COMPETITION.

NOW that we have completed the publication of the designs awarded prizes in the bungalow competition recently conducted under the auspices of this journal and our readers have had opportunity of studying the several plans submitted, it is probable that some may wish to make the acquaintance of the authors to whom the prizes have been awarded. As it is not possible for any large percentage of our readers to do this in a personal way, we take pleasure in presenting herewith portraits of the winners of the three prizes, together with brief sketches of their business careers.

The winner of the first prize, A. Howard Fidler, whose likeness is presented herewith, was born in Guelph, Ontario, Canada, April 9, 1885, and while still an infant his parents moved to Jamestown, N. Y. Here he received a high school education and while attending the Jamestown High School he devoted considerable time each day to the manual training department under the

A. HOWARD FIDLER,
Winner of the First Prize.

direction of George F. Hale, an expert architectural draftsman and building superintendent.

After leaving the Jamestown High School the year 1903-4 was spent at Mercersburg Academy, Mercersburg, Pa., where Mr. Fidler passed all the entrance requirements for the architectural course at Syracuse University. In the fall of the year 1904, however, when about to enter the University, an offer was tendered to represent a Buffalo house on the road as traveling salesman and, as the money consideration was attractive, Mr. Fidler accepted and followed a commercial career.

Soon after accepting this position he by chance saw a copy of *Carpentry and Building* on a local newsstand and after glancing it through purchased a copy. A very short time afterward he became a regular subscriber and states that he hopes to remain one for the rest of his natural life. From the close study given the various plans, details, specifications, &c., which appeared in successive issues of the paper he ventured to enter a drawing in the two-family house competition a little more than a year ago, and, while unsuccessful in securing a prize, his design was of such merit as to warrant its publication, and it appeared in due course. This gave Mr. Fidler encouragement and he entered the bungalow contest this year, with the result stated. He did all his work evenings and whenever spare moments presented themselves. He states that whatever honor he may have received he wishes to share with *Carpentry and Building*, for he is a firm believer in "giving honor where honor is due."

It may be interesting to state in this connection that the contract for a bungalow which he is now building in Jamestown was the direct result of his winning the first prize in the bungalow competition recently conducted by *Carpentry and Building*.

Since winning the prize in the bungalow contest he has enrolled in the complete architectural course with

W. H. HIGGINBOTHAM,
Winner of the Second Prize.

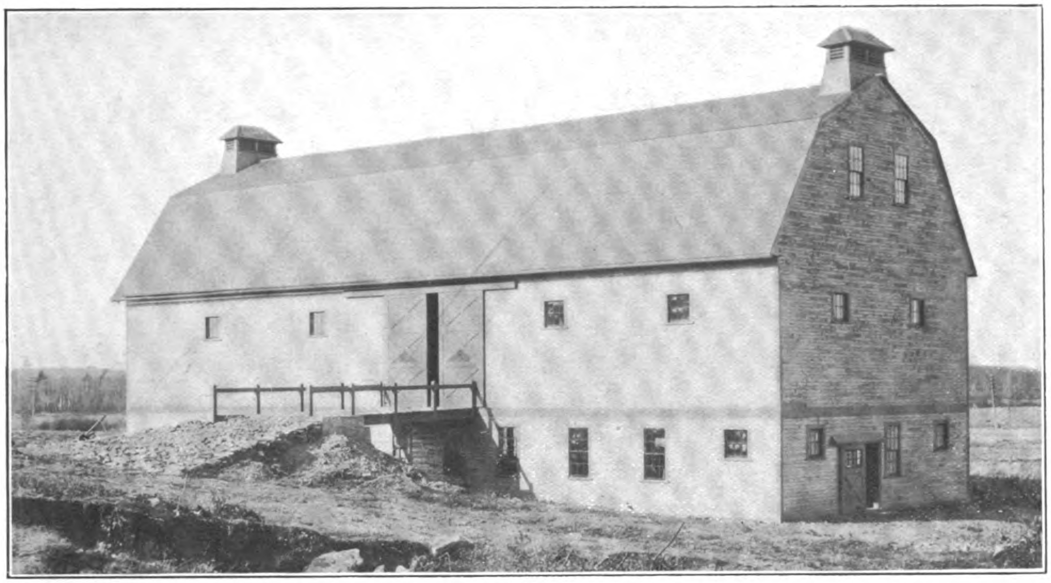
the International Correspondence Schools and expects in the not very distant future to be able to surrender a commercial career for architecture.

The author of the design awarded the second prize in the bungalow competition, W. H. Higginbotham, was born in Hopkinton, N. Y., in the year 1879. His early education was outlined in the common school of that place and after finishing his school career he became interested in the building line. He decided to learn the trade of carpentry, with the intention of becoming a first-

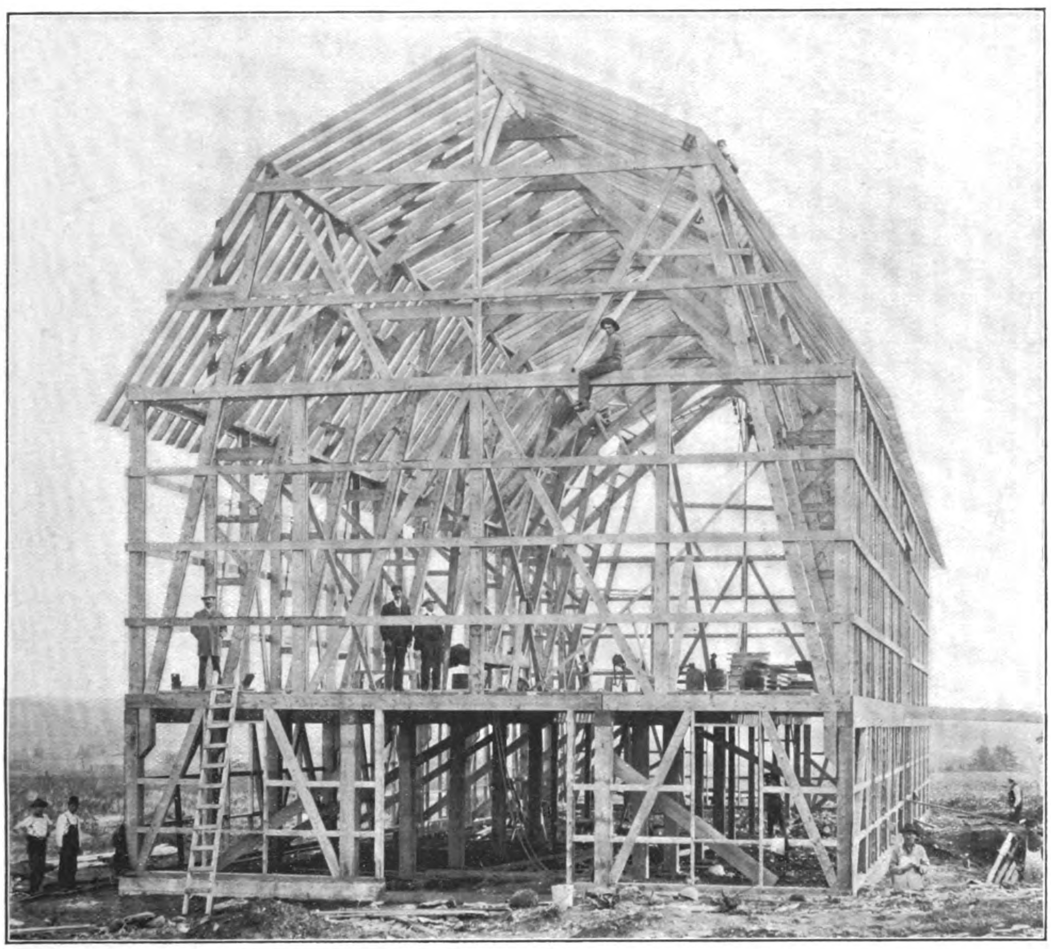
LOUIS A. CLARKE,
Winner of the Third Prize.

class mechanic, and therefore took advantage of every opportunity offered for his advancement in this line. With something like 11 years experience as a carpenter at Saranac Lake and other parts of the Adirondacks, and by persistent study, he acquired a good knowledge of cottage designing and rustic work.

He then became anxious to advance higher in the



VIEW OF THE COMPLETED BARN SHOWING BRIDGE APPROACH



END VIEW OF BARN WITH FRAME READY FOR BOARDING

PLANK FRAME FARM BARN AT BANGOR, MAINE

J. C. AND J. H. STEVENS, ARCHITECTS

Supplement Carpentry and Building, July, 1909

building line, and not being able to take a college training enrolled in the International Correspondence Schools for a complete architectural course. As he progressed in his studies he became desirous for practice in a structural and finished line of architecture and therefore went to Yonkers, N. Y., where he now resides. His picture is published herewith.

The third portrait which we take pleasure in presenting to the attention of our readers is that of Louis A. Clarke, to whom was awarded third prize in the bungalow contest. He was born in the city of Independence, Iowa, August 4, 1887, his parents moving to Los Angeles, Cal., the same year. His father, Archer E. Clarke, was engaged in the lumber business in the city named up to the time of his death, two years ago, and naturally his son became more or less interested in the same line of business.

Louis A. Clarke, the subject of this sketch, received his education in the grammar schools of Los Angeles and Pasadena, Cal., and in the Los Angeles High School. He commenced the study of architecture while in the high school, taking a special night course in the local Young Men's Christian Association.

Upon leaving the high school he took a position in the office of Otto H. Neher, an architect making a specialty of reinforced concrete. He later was employed by various Los Angeles architects in the capacity of draftsman and designer, but is now engaged in the lumber business in Los Angeles, where he is meeting with that success which comes from earnest and persistent effort.

UNIQUE ARCH IN A CHURCH BELFRY.

BY OWEN B. MAGINNIS.

TO the observing student of architecture or building construction any detail which departs from fixed stereotype conditions is always a subject of interest, and it is to this end that what follows is here presented. If any one visiting the island of Manhattan should take a walk down Fifth avenue commencing at 120th street and Mount Morris Park, and using his eyes in contemplation of the architecture of the buildings which meet his gaze, he will find, if he has a knowledge of styles, many excellent samples of them, all designed by the best architects, and embracing domestic and public buildings, churches, &c., running all the way from the Carnegie palace on the north to the Washington Arch on the south. Toward the end of his walk his attention will perhaps be drawn to the comparatively simple little Church of the Ascension, famous throughout the world as housing the splendid picture of the "Ascension" painted by John La Farge. The church, which also contains a magnificent organ, is in design an excellent example of the early English Gothic. It is fronted by a square tower all built in Connecticut brown stone, and presents in its entirety a most antiquated appearance.

The windows inclosing the belfry are, however, the subject of this article, and are well worthy of the attention of the observer. Reference to the sketch here presented will give the reader a fair conception of this most unusual type of windows, of which there are three in the tower—one facing north, one south and one east. All three are alike and we will endeavor to analyze the construction of one of them.

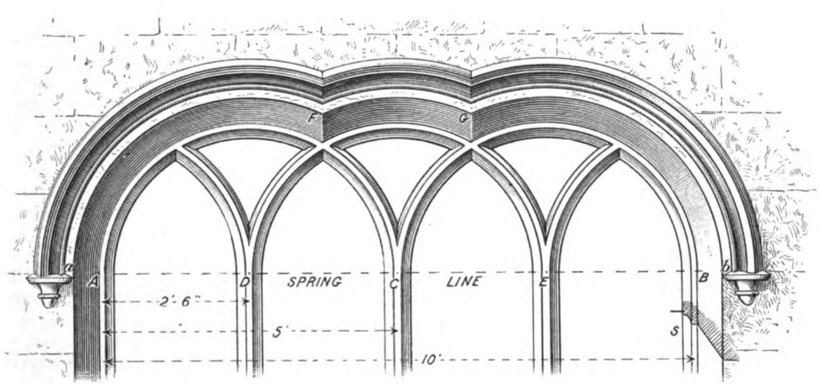
Primarily each window consists of an opening in the ashlar masonry 10 ft. wide, clear of the jambs, and 20 ft. in hight measuring from the soffit of the arches to the top of the sill. These jambs are simply chiseled to a chamfer, as indicated in the section at S at the right, and are built plumb to the spring line A B, from which the geometrical work starts, which is of unusual character.

To lay out the arch draw the spring line at the level of the tops of the corbels and bisect it at C and bisect A C and C B at D and E, all this being done with the utmost accuracy as to the exact measurements.

Now with the compass or trammel from D as a center, with the radius set to the outer line of the jambs at the right and left sides, as at *a* and *b*, sweep the areas *a* F and *b* G. Now with C as a center and the same radius as before, describe the arc F C intersecting the other curves at F and C. The curves A F, F C and C B will be the front arris line of the soffit of the stone arch. From this line upward with the same centers and with radii lengthened to include the width of the arch the moldings may be drawn as shown.

At this point we must consider in a general way the static or constructive value of the arch. It will be noticed that owing to the depressions at the intersections F and C the arch if not supported on the haunches would sag and collapse but for the fact that the random ashlar masonry fulfills this function and the voussoirs being fitted to a 1-16 in. joint render the whole construction incapable of settlement. In addition each arch carries but little weight, being close up to the cornice level, and as ashlar work corbels itself as each course is laid, it follows that the arch would really only have to sustain a weight of stone work contained within the area of an equilateral triangle, the sides of which would be equal to the base A B. The arch is therefore statically safe, as is fully evidenced by the fact that it has been in existence for many years.

Concerning the Gothic window work in the stone



A Unique Arch in the Belfry of the Church of the Ascension.

opening it might be stated that this is of oak and contains the windows and louvres necessary for the belfry. The layout is so simple as to render a description superfluous, but taking the construction in its entirety it is a unique design and well worthy of careful observation.

Making Hardwood Doors.

Some rather interesting particulars concerning the utilization of hardwoods are found in a series of articles running through current issues of the *Hardwood Record*. Among the uses to which hardwoods are put at the present day is the making of so-called hardwood doors, in which the core or center of the door is of some light, soft wood, while the outside is a veneering of hardwood. Concerning the making of such doors a recent issue of the journal in question says:

For many years the solid hardwoods were used in making doors, but gradually they were replaced by the cheaper and more easily handled softwoods, such as pine. This transformation was slow but sure until, with the exception of those cases in which hardwood doors were necessary because of some special characteristic, the pine door had almost entirely supplanted its more expensive rival. Later, however, an imperative demand arose for hardwood doors. This was due to the fact that the one thing needed to dignify the appearance of an otherwise architecturally perfect house was a set of doors which harmonized with the decorations. Such harmony could not be obtained with an ordinary pine door, and so the manufacturer was confronted with a serious problem. He knew, as does every lumberman, that a solid piece of hardwood is heavy and unwieldy, and that doors made from such pieces have the unpardonable property of warping, twisting and opening at the joints.

As is usually the case, however, this problem had a solution, and the manufacturer found it when he developed the idea of veneered doors. By making the core, or center of the door, of pine or some such light wood, and by veneering the hardwoods onto this, the beauty and other advantages of hardwood doors were retained, while most of the disagreeable features pertaining to them were done away with. It is true that at the present time the greater number of doors turned out annually are of softwood, but the marked advance of hardwoods in popularity during the last few years indicates that it is only a matter of a short time until all of the better class houses, offices and other buildings will be fitted out with hardwood doors almost exclusively. To the hardwood lumberman this is naturally a source of satisfaction.

Kiln Drying a Necessity.

In the manufacture of doors, thorough kiln drying is of the utmost importance. With outer doors especially the tendency to warp and shrink is very great indeed, and unless the core as well as veneer is entirely freed from moisture at the very start, this tendency cannot be overcome. Thus upon receiving a consignment of lumber the first step is to get it into the dry kiln as soon as possible, unless it has not been previously air dried, in which case the process is thoroughly completed in the yard of the factory before it is taken to the kiln. It remains in the kiln as long as possible, and when taken out to allow room for another lot goes directly to the factory for immediate use.

The work done by the cut-off and ripping saws during the preliminary steps in the transformation of the rough boards into the correct sizes for doors is of course very simple, as compared with some of the more intricate work which follows, but even here the utmost care is exercised. All of the latest machinery is used, so that a few men can do an enormous amount of work in a comparatively short time.

As stated before, the core of the door is almost invariably made of pine, though sometimes other woods are used, chestnut being especially applicable because of its lightness and nonwarping properties. This core is made of narrow strips of wood with pieces of hardwood at the edges. These pieces are all fitted with tongue and groove or are perhaps dovetailed, and are glued together and subjected to powerful hydraulic pressure, thus insuring a perfect joint. Of course, this applies chiefly to the stiles and rails for the thin panels, which are usually made of one solid piece of softwood which is covered on both sides with a beautiful piece of hardwood veneer.

The veneers themselves are made from all varieties of hardwoods, the principal ones being birch, plain and quarter sawed red and white oak, brown ash and mohogany. With the best doors these veneers are ¼ in. thick, which is far above the average for furniture veneers. This is particularly necessary in outside doors. The best veneers of birch and some other woods are rotary cut in this operation, bringing out the beautiful figure and grain of the wood most effectively.

Millwork plays a rather important part in the making of doors, for with the outer ones especially molding around the panels and glass are quite common. The egg-and-dart molding is perhaps seen more often than any other one kind, although there are several other varieties on the market. The dentil-stool, which to the uninitiated is the wooden projection just below the glass in a front door, is also made in various designs. In striking contrast to this work, which is done by machinery entirely, is the hand carving with which some doors are decorated. As in the case with so many pieces of furniture, this hand carving tends to "tone up" the entire article and make it a work of art.

Assembling the Parts.

After the veneer is thoroughly dried on the core, the edges are smoothed and the whole carefully sandpapered so that the entire door is ready to be fitted together. This assembling of the different parts in the case of doors is simplicity itself, as compared with the same operation in the manufacture of desks, for instance, for in the latter case this work is done by many different laborers, while with doors other than those which employ glass in their construction, the entire operation is frequently accomplished by machinery.

Thus in the making of an ordinary five or six panel door the outer stile is laid down in a horizontal position on a special machine, which is in reality a press. This stile has holes into which the pegs of the cross rails fit. One man begins at each end of the uncompleted door and covering one end of the top or bottom rail, as the case may be, with glue, fits it in its proper place and hammers it down with a wooden sledge. Next comes a panel whose tongue fits into the groove running up the side of the rail. The next rail is then hammered in place, thus firmly securing the panel between, and so on until the men meet at the center and fasten the last rail. The projecting ends and pegs of the rails are then given a coat of glue and the other outer stile fitted on them. Upon reversing a lever the machine compresses the entire door to such an extent as to make tight fitting and strong joints. The whole operation is completed in a couple of minutes and the next door started immediately. Two interesting facts in connection with this phase of the operation are that the bottom rail of a door is always made much wider than the top rail, and that glue is not used in fastening the panels to the rails except, perhaps, in the case of a single panel door. This is usually not necessary, for the panels are entirely surrounded by stiles and rails which in their turn are firmly fastened to each other.

The varnishing or shellacking of doors is also comparatively simple, although great care is taken in finishing up outer ones especially. This varnishing is of course done in a separate room in order to lessen fire risks, and from this room the doors pass directly to the storage or shipping department, as the case may be.

A new idea in regard to doors is now being worked upon by a manufacturing concern of Chicago. Their idea for "the door of the future," as they call it, is to conform to that ever increasing demand for sanitary types. They make a perfectly flush door by veneering hardwoods on a softwood core and decorating the whole by means of inlaid work. Thus any degree of elaboration may be obtained, and the result is often very pretty, indeed, for by these means the natural beauty of the wood itself is very forcibly emphasized.

SOME INTRICATE PROBLEMS IN FRAMING.—V.

BY C. J. MCCARTHY.

WE shall next consider the problem of laying out window frames in circular walls as would be the case, for example, in a circular tower or semicircular bay window. In doing this work it is necessary to make a special form of frame laid out from a template of the exact curve it is required to fit, and if in addition to the wall being curved the head of the window is semicircular or semielliptic, the problem is still further complicated by the necessary geometrical development of the details.

Referring to Fig. 21 of the illustrations, the reader will find the plan of a window frame built in the circular wall of a tower. The pulley stiles are set perpendicular to the chord of the opening or parallel to the axial line B G D. The method of developing the semicircular soffit may be explained as follows: Draw the chord E D F from the inside edges of the pulley stiles; find the center D and from it erect the perpendicular D G B. At any convenient hight draw indefinitely the line A G C and prolong the face line of the pulley stiles to meet it in the points A and C. Now with the radius A G and with G as center, describe the semicircle A B C; divide the quadrant B C into any number of equal parts, as 1, 2, 3, 4, &c., and draw the ordinates 1 *r*, 2 *o*, 3 *l*, 4 *i*, &c. Upon any straight line, as A D C of Fig. 22, lay off the divisions 1, 2, 3, 4, &c. of the quadrant B C of the previous figure, dividing it into several parts indicated by *b*, *c*, *d*, *e*, *f*, D. Raise the perpendiculars A 1, *b* 2, *c* 3, *d* 4, &c., producing them indefinitely. Make A 1 equal to the width of the pulley stile. Make *b g* 2 equal to *r g p* of Fig. 21; make *c h* 3 of Fig. 22 equal to *o n m* of Fig. 21; also *d i* 4 equal to *l k j*; *e j* 5 equal to *i h g*; make *f k* 6 of Fig. 22 equal to *f e d* of the previous figure, and make D *l* B of Fig. 22 equal to D *b a* of Fig. 21. Proceed in like manner from D to C, when the curves 1 B *l* and A *l* C, drawn through the points thus found, will be the development of the soffit.

To obtain the curve of the outside box casing we first draw indefinitely the line A C of Fig. 23. Now from *s* of Fig. 21 draw *s u* perpendicular to the line A G. Divide *u* G into a number of equal parts and draw the ordinates 1 *a'*, 2 *b'*, 3 *c'*, 4 *d'*, &c. From the center G draw the quadrant *u v*, cutting the ordinates in the points *a'*, *b'*, *c'*, *d'*, *e'*, *f'* and *g'*. Next divide the arc *s t* of Fig. 21 into a number of equal parts, as indicated by the figures 1', 2', 3', 4', &c.; lay off these divisions from A to D of Fig. 23, dividing it as shown by 1, 2, 3, 4, 5, 6, 7, D. Make 1 *a* equal to 1 *a'* of Fig. 21; make 2 *b* equal to 2 *b'* and 3 *c* equal to 3 *c'*, and so on with the other ordinates.

Proceed similarly with the other half of Fig. 23, and through the points obtained draw the curve A B C, which will represent the curve of the inside edge of the outside box casing. The curve for the outside edge may be obtained by setting a gauge to the width of the casing. The curve for the inside box casing may be obtained in a similar manner. Fig. 24 represents a section of the frame and sashes to a somewhat larger scale, showing the position of the rebates for the glass and general make-up of the frame, which will be readily understood without further explanation.

In Fig. 25 of the diagrams is represented an opening in a straight wall with splayed jambs and a circular splayed head. To unfold the length and shape of the soffit let A B and C D represent the opening, C A and D B the splayed jambs; continue the face line of the jambs until they intersect at E. Now from E through the center of the opening draw E F. With H and P as centers describe the semicircles C G D and A F B, which is the elevation on each side of the opening. Divide the quadrant B F into any number of equal parts as 1, 2, 3, 4, 5, &c. Now with E as a center and E D and E B as radii describe the arcs D J and B K. Upon the arc B K lay off twice the divisions 1, 2, 3, 4, &c., of the quadrant B F, dividing it in the points 1', 2', 3', 4', &c., to the point K. Connect E K, then B 7' K and D J represent the length

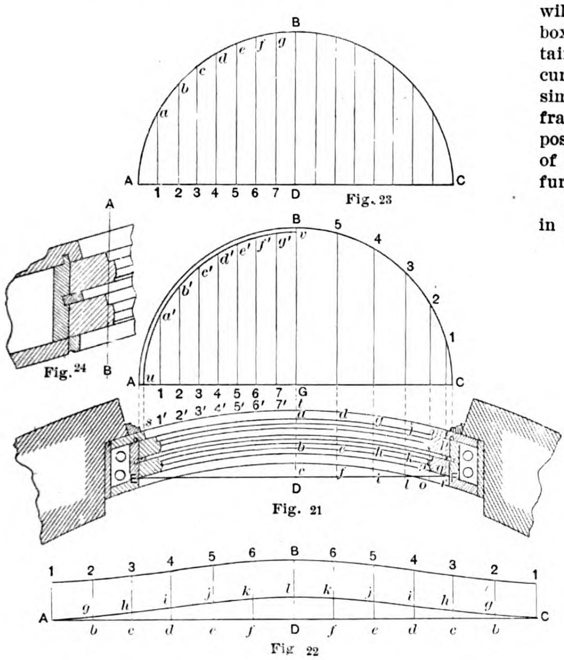


Fig. 21.—Plan of Window Frame in Circular Wall.
Fig. 22.—Showing Method of Developing the Semicircular Soffit.
Fig. 23.—Obtaining the Curve of Outside Box Casing.
Fig. 24.—Section of Frame and Sashes, Showing General Construction.

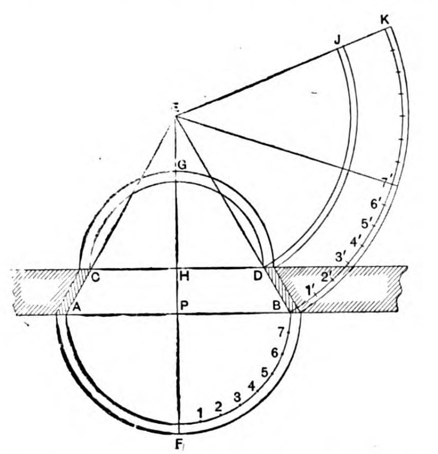


Fig. 25.—Diagrams Representing an Opening in a Straight Wall with Splayed Jambs and Circular Splayed Head.

Some Intricate Problems in Framing.—V.

and shape of the soffit to be bent over a suitable center after being treated by one of the several methods of doing such work. After being bent the edges of the soffit must be beveled as shown at B and D. Whether bent by means of keyed grooves, saw kerfed or backed up with staves and veneered, the staves or grooves must radiate from the center E. Sufficient over-wood must be left beyond J K and B D for the purpose of splicing to the straight jambs.

An opening in a straight wall with splayed jambs and pointed soffits next demands attention. To unfold the length and shape of the soffit, as shown in Fig. 26, let A B C D represent the plan of the opening, L C the face of one of the splayed jambs, and let E F be the center line of the plan. Now parallel to E F draw D I and C G. With I as center and radii I G, I L and I A, describe

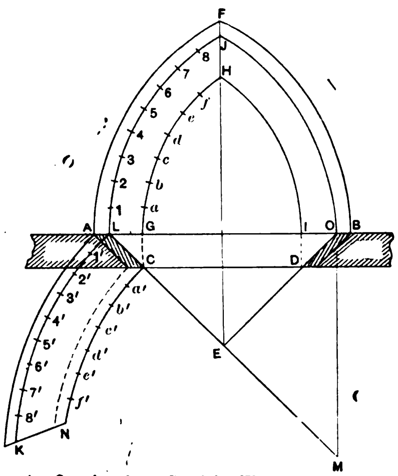


Fig. 26.—An Opening in a Straight Wall with Splayed Jambs and Pointed Soffit.

A B and C D represent the jambs and E the center, from which the wall is struck. Produce the face lines of the jambs E B A and E C D to meet the tangent C F I. Now with F as center and F I as radius describe the semicircle G H I; divide the quadrant G H into a number of equal parts as 1 2 and draw the ordinates 1 *s*, 2 *t* and H F. From E draw the lines E F, E *t* and E *s*. Draw *j i* perpendicular to E F; also draw *h g* and *f e* perpendicular to E *t* and *b a* and *d c* perpendicular to E *s*. Make *h g* equal to 2 *t* and *d c* equal to 1 *s*; join E *e g* and E *a c*.

From the center E with E I as radius describe the arc I K indefinitely. On this arc lay off twice the divisions 1 2 H of the quadrant G H, dividing it in the points 1′, 2′, J, 2″ 1″, K. Draw the radial lines E 1′, E 2′, E J, &c., and to them transfer the lengths E B A to E M *w* and E *a c* to E *q r*; also transfer the lengths E *k l* and E *e g* to E *o p* and E *m n*. Through the points thus found draw the curves C L M and D J *w*, which will be the required development of the soffit.

The next problem claiming attention is the development of the soffit of an opening in a circular wall with jambs and circular head splayed equally. Referring to Fig. 28, let A B C D represent the plan of the opening and A B and C D the jambs. Draw the chord B D and perpendicular to it draw indefinitely the line E F H. Prolong the face line of the jambs A B and C D to meet the line E F H in the point E. Now, with F as center and F B as radius, describe the semicircle B H D. Divide the quadrant into a number of equal parts, as 1, 2, H, and draw the ordinates 1 *a*, 2 *b*; draw also the lines E *a* and E *b*. Draw *n′ n* and *m′ m* perpendicular to E F. Draw *f g*, *c i*, *b h* perpendicular to E *b*. Make *b h* equal to *b* 2 and join E *g i h*. Now draw *e l*, *d k* and *a j* perpendicular to E *a*. Make *a j* equal to *a* 1 and join E *l k j*.

From E as center and with radius E D describe the arc D I J indefinitely, and on it from D set off twice the divisions 1 2 H of the quadrant B H, dividing it as shown in the points 1′, 2′, 1, 2″, 1″, J. Now from E draw the radial lines E 1′, E 2′, E I, &c. Next lay off I *v g* equal

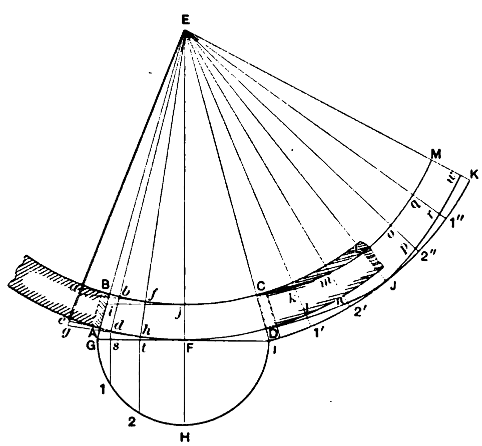


Fig. 27.—An Opening in a Circular Wall with Circular Soffit and Jambs Radiating to the Center from Which the Circular Wall Is Struck.

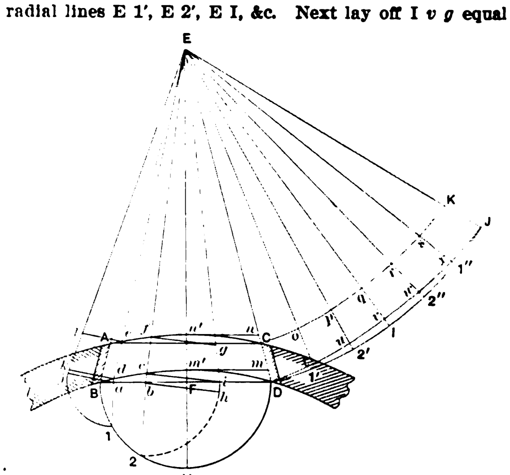


Fig. 28.—An Opening in a Circular Wall with Jambs and Circular Heads Splayed Equally.

Some Intricate Problems in Framing.—V.

the arcs G H, L J and A F, respectively, as shown. Divide L J and G H into any number of equal parts, but not necessarily into the same number. Draw O M parallel to E F and prolong L C to M. Now on M as a center describe the arcs C N, L K, &c. On the arc C N lay off the divisions of the arc G H, and on K L set off the divisions of L J. Now connect N with K; then K N L C is one side of the soffit. Sufficient wood must be left beyond L C for splicing to the straight jambs, also for beveling, as shown at A.

In Fig. 27 we have an opening in a circular wall with a circular soffit and jambs all radiating to the center, from which the circular wall is struck. To find the length and shape of the soffit proceed as follows: Let

to D *m n* and 2′ *u p* and 2″ *w r* equal to *h i g*; make 1′ *t o* and 1″ *x s* equal to *j k l*, and then make J K equal to D C.

A curve drawn through the points thus found will be the development of the face of the soffit, which will have to be beveled as shown at C and D to fit the surface of the wall.

The development of the soffit of a circular headed opening in a straight wall with splayed jambs but with the soffit falling level at the crown, thus making a semicircle on one side of the wall and a semiellipse on the other, is illustrated in Fig. 29 of the diagrams.

In order to find the development of the soffit proceed as follows: Let A B C D represent the plan of the opening; draw the center line E F G H I and prolong the face line of the jambs A C and B D to meet it in the point E. Now from G as center and with G A as radius describe the semicircle A F B, which will be the interior elevation of the soffit. Divide it into any number of equal parts as 1, 2, F, 2', 1', B, and through each of these parts perpendicular to A B draw the ordinates a' 1, b' 2, b 2' and a 1'. From E through a', b', b and a draw the lines E c, E d, E d' and E c'. From d', c', d, c let fall perpendicular lines producing them indefinitely. Make H I equal to G F and the other ordinates equal to corresponding ones in the semicircle A F B. Through the points thus found trace the semiellipse C I D, which will be the exterior outline of the opening.

To find the length and shape of the soffit we first draw E g perpendicular to E B. Make E g, E f, E e equal to G F, b 2', a 1', respectively. Now with e as center and with E a as radius describe the small arc at 3; then with B as center and B 1' as radius describe another arc cutting the first one. Through the intersection of these arcs draw indefinitely the line e 3'. Again with f as center and E b as radius describe the small arc at 4. Again with 3 as a center and 1' 2' as radius describe a second arc intersecting the first one at 4. From f draw the line f 4' indefinitely.

Now with g as center and E G as a radius describe a small arc at 5, and with 2' F as radius and 4 as a center describe another arc cutting the first one in 5; through 5 draw the line g 5' indefinitely. With g as a center and with g E as radius describe the arc E J K; produce g 5' to J. Make the arc J K equal to the arc J E and join g with K. Make g h, g i and g K equal to g f, g e and g E, respectively.

Now with g as a center and with any convenient radius describe an arc as j p of indefinite length and set off upon it m n o p equal to m l k j as shown. Through the points n, o, p draw h 6', i 7' and K 8'. Now make n 6 equal to l 4 and o 7 equal to k 3 and p 8 equal to j B. Make 5 5' equal to G H and 4 4' and 6 6' equal to b d. Again make 3 3' and 7 7' equal to a c and 8 8' equal to B D. A curve drawn through the points B, 3, 4, 5, 6, 7, 8 is the interior edge of the soffit and one through D, 3', 4', 5', 6', 7', 8' is the exterior edge. Sufficient over-wood must be allowed in width for beveling, as at D, and also in length beyond C D and 8 8' for splicing to the straight jambs.

In order to insure a better understanding of this work an isometrical projection of the conelike solid, the surface of which corresponds to the contour of the inside of the arched opening is shown in the diagram, Fig. 30. At the interior the opening is a semicircle, as A F B, and the top F I being level the hight H I on the exterior is the same as G F on the interior, but the sides being splayed toward the outside the width of the exterior C D is greater than that of the interior A B; therefore, the exterior elevation of the opening is a semiellipse.

The other letters in this diagram refer to the same points as similar letters in the diagram, Fig. 29.

We will next take into consideration the development of the soffit of the opening in a circular wall, having splayed jambs and circular head falling level at the crown, thus forming a semicircle on one side of the wall and a semiellipse on the other.

Referring to Fig. 31 of the diagrams, let A B C D represent the opening and splay of the jambs. Prolong the splayed faces of the jambs A E and C D until they meet in the point E. From E through the center of the opening draw the line E I indefinitely. Draw also the chord lines A C and B D. From G, with radius G A, describe the semicircle A F C and divide it into a number of equal parts, as 1, 2, F, &c. Through each of these parts let fall to A C perpendicular lines, as 1 a, 2 b, &c. From E draw lines through a and b to f and g and the corresponding lines on the other side of G H. Now perpendicular to B D draw f 1', g 2', &c., and make them equal to a 1, b 2 and the other ordinates of the semicircle A F B. Trace the semiellipse B I 2' 1' D, which will be the exterior profile of the arch.

To find the length and shape of the soffit draw perpendicular to E C the line E t equal to G F. Make E r and E s equal to a 1 and b 2, respectively, and with t as center describe the arc E J K of indefinite length. With r as center and with E c as radius describe an arc, and with C as center and C 1 as radius describe a second arc, cutting the first one in the point 3. Through 3 draw the line r 3'.

Next with s as center and E d as radius describe an arc, and with 3 as center and 1 2 as a radius describe another arc intersecting the first one in the point 4. Again with t as center and with E e as radius describe an arc, and with 4 as center and 2 F as a radius describe another arc intersecting this one in the point 5. Through 4 draw the line s 4' and through the point 5 draw the line t 5', producing the latter to J.

Make the arc J K equal to the arc J E and join t K. Make K v and K u equal to E r and E s. With t as a center describe the arc k q and upon it lay off n o, n p, n q, equal to n m, n l and n k. Through o p and q draw u 6', v 7' and K 8'.

Now make 5 5' equal to e j; make 4 4' and 6 6' equal to d i, and make 3 3' and 7 7' equal to c h and 8 8' equal to C D. Now through C, 3, 4, 5, 6, 7, 8 trace a curve which will be the edge of the soffit on the convex side of the wall, and through D, 3', 4', 5', 6', 7', 8' trace a second curve which will be the edge on the concave side.

The final directions given in connection with Fig. 29 apply equally in the present case.

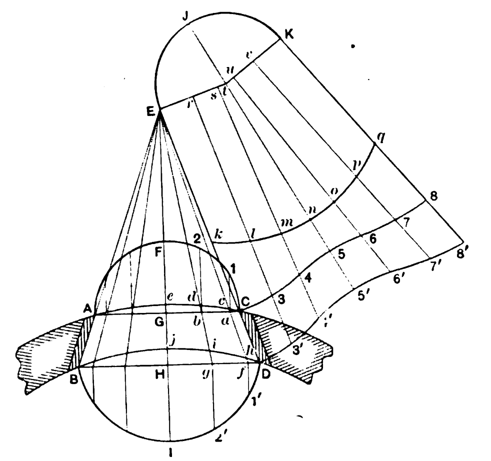


Fig. 31.—An Opening in a Circular Wall with Splayed Jambs and Circular Head Following Level at the Crown.

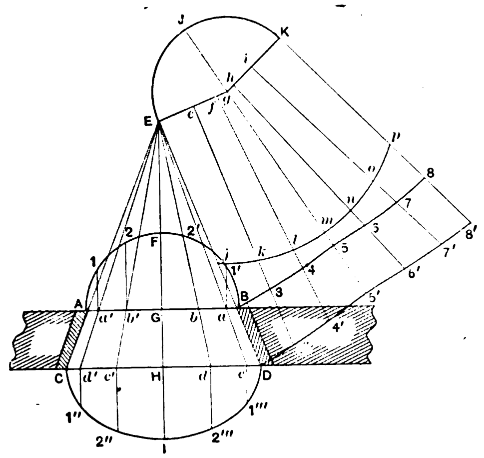


Fig. 29.—An Opening in a Straight Wall with Splayed Jambs and Circular Soffit Following Level at the Crown.

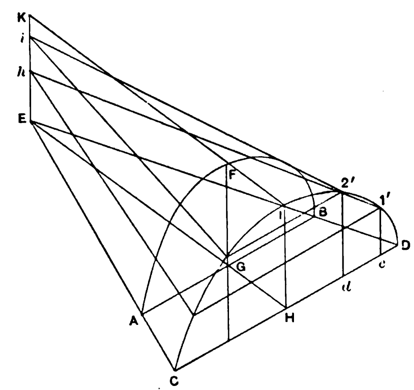


Fig. 30.—Isometrical Projection of Cone-Like Solid, the Surface of Which Corresponds to the Contour of the Inside of the Arched Opening.

Some Intricate Problems in Framing.—V.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS,	PRESIDENT
CHARLES KIRCHHOFF,	VICE-PRESIDENT
RICHARD R. WILLIAMS,	TREASURER
GEO. W. COPE,	SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

JULY, 1909.

Specifying Interior Decorations in Metal.

More or less discussion has recently developed regarding the manner in which the sheet metal work in connection with a building is often covered by the average architects' specifications, which in many instances are made to include in combination form tin, slate and galvanized ironwork, together with metal ceiling in either copper or steel, as may be desired. It has generally been recognized ever since metal ceilings, siding, wainscoting, &c., were first devised that they constitute a different line of sheet metal work from that regularly conducted in the average sheet metal shop. Manufacturers who specialize in the production of sheet metal products for the interior of a building have found that dissatisfaction frequently results from the custom of architects to combine sheet metal work in the manner indicated, and many who turn out artistic ceilings, siding, coves, friezes, &c., are endeavoring to induce architects and builders to separate the two classes of sheet metal work and specify them accordingly, so that separate bids may be tendered therefor. It is well understood that the average shop making a specialty of skylight work, tin roofing, &c., is not always properly equipped to advantageously take up the business of installing metal ceilings and other sheet metal work now widely used for the interior decoration of buildings, whether they be intended for dwelling or for business purposes. On the other hand, many of the establishments making a specialty of interior sheet metal work are not always in a position to do outside metal work. It is, therefore, well not to lose sight of the fact that the metal ceiling industry stands by itself, and that specifying this class of work by a separate clause without any connection with the tin, slate, galvanized iron or gravel roofing feature would prove advantageous in many ways. It should be borne in mind, too, that there are establishments in the country which have made a special study of metal ceiling and copper work for interior finish and which would not be able to submit figures made up in the combination form to which incidental reference has been made. By recognizing the fact that while the material is sheet metal its application is a special division of the industry and entirely different from the ordinary sheet metal work as turned out in the roofing and skylight shop. Certainly the desired change in practice would still leave the one shop open to bid for both kinds of work, if such a course seemed desirable to the proprietor. There is always some friction on the line of cleavage, and it is probable that considerable energy must be expended before architects recognize the merit of the separation of the two classes of the work. Whether or not sheet metal workers generally will aid manufacturers of specialties to induce architects to separate these two classes may be a question, but it is certain that most of the labor will fall upon manufacturers of interior sheet metal decorative panels and ceilings in their visits to architects.

Fireproof Factory Buildings for the Country.

Notwithstanding the progress which is being made at the present day in fire resisting construction, the fireproof factory building in localities without fire fighting facilities is still something of a rarity. Mill construction has the preference, and wooden factories are often erected to house valuable equipment and manufactured products and the materials from which they are made. In populous centers the fireproof industrial building is gaining in favor. The risk of conflagration is greater than in a small town, but, on the other hand, there is usually adequate protection, both in the way of apparatus and water supply. The insurance rate is less in the city, from which it may be deduced that the risk is greater in the country and the need of fireproof buildings correspondingly important. Probably there is insufficient general knowledge of the rapid strides that have been made in the development of the several elements entering into fireproof construction by which its cost has been lessened. As compared with the slow burning type, the cost to-day is only about 10 per cent. more for a building in which the hazard of fire may be considered negligible under ordinary circumstances, especially in neighborhoods where there is no risk from outside. In exceptional cases, where the contents are of an especially inflammable nature, the argument may not hold, but such instances include few machine shops or factories in the metal industries. While the initial investment is somewhat greater, against this is the offset of a decreased insurance rate, which materially reduces the additional annual interest on the investment. In a recent case a canning factory located on Cape Cod, outside of a zone of fire protection, was built on fireproof principles and equipped with a complete sprinkler system, and the result was a decrease in the insurance rate from $2.25 to 75 cents. In mill construction where oil is freely used in manufacturing, as is the case in many metal industries, the risk of serious fire increases with the passage of time, the saturated woodwork becoming more and more inflammable with the drying influence of age.

Factor of Risk.

Hardly less important than the destruction of property, in considering the danger of loss by fire, is the factor of risk which cannot be covered in a policy. When a shop is burned with complete loss the insurance companies make good the property destruction. But they cannot make compensation for the loss of business and the inability to fill orders or to accept them; the destruction of patterns and drawings; and the handicap which this all means in keeping a footing in the trade. The investment of an additional 10 per cent. on buildings, less the saving in insurance premiums and possibly in cost of maintenance, is a small matter as compared with immunity from crippling loss. A great deal of industrial building is contemplated which will materialize this year and next. The men upon whom the responsibility rests might do well to investigate thoroughly the subject as it is now presented by those who contribute to the improved construction.

Novel Hotel Building.

The metropolis is rapidly gaining a reputation for architectural novelties of interest to the designer, the builder and the engineer, and the list of attractions for members of these professions is constantly growing. One of the latest novelties in the architectural line is the new building which will soon rise on the present site of Hotel Metropole, now in process of demolition, at the junction of Broadway, Seventh avenue and Forty-second street, Borough of Manhattan, New York. The unique feature of the structure that is to occupy this site is not so much in its size as in its peculiar construction, the design calling for a building only six stories in hight, but from the center of it will rise a tower 30 ft. square and extending 200 ft. above the level of the street, covered by advertisements of various kinds and illuminated at night with such brilliancy as to make the "Great White Way" even more dazzling than at present. The building is designed in English perpendicular Gothic, with long lines to emphasize the hight, and with an ornamental cornice with corner pavilions and high battlement. The top of the tower is to be treated in a similar manner, and from the extreme peaks will flutter numerous banners and streamers. The plans have been prepared by Henry Ives Cobb, the well-known architect, and every effort will be made to have the structure completed by the end of the current year. All of the skill of the electrician will be utilized to make this tower an attraction as well as a striking feature of the eastern metropolis. Some might urge that the multiplicity of advertising signs on the tower would prove a serious objection, but in refutation of this charge it is declared that the arrangement will be such as to render the display attractive and pleasing to the eye, and will constitute a beautiful architectural effect by day and a tower of light by night.

Duluth Builders' Exchange and the "Open Shop."

Ever since the business depression of 1907 the members of the Builders' Exchange of Duluth, Minn., have operated under the "open shop" policy in the building business, and at a recent meeting of the exchange the following announcement was issued as to the workings of the open shop during the time which has elapsed since the fall of the year mentioned:

That period has generally throughout the country been marked by a business depression bordering upon a panic, which has resulted in falling prices for materials. The building industry in other cities in that time has been substantially at a standstill, with a large percentage of mechanics unemployed. During the same period, however, the building industry of Duluth shows a gratifying increase, both in volume of work and number of men employed. Although hundreds of mechanics were brought in at the beginning of the open shop movement who remained after the local men returned to work on the open shop basis, there has been plenty of work for all. In fact, without the new men, the increase of work could not have been cared for.

The wages of first-class mechanics under the open shop policy have not been decreased or the hours lengthened. Better results have been obtained in the way of economy and speed of construction from the increased efficiency of the men, the freedom from labor troubles, and the greater control of the employer in organizing and directing work. We believe it has been practically demonstrated that the open shop is a great and substantial benefit to the employer, the mechanic and the city of Duluth, and that the welfare of the community and its industrial progress render its maintenance of vital importance.

On account of the exceptional and favorable conditions prevailing in this city, we are glad to recommend that no reductions be made in the wages of building mechanics, but that the scale adopted last year remain unchanged.

Authorized scale of wages per hour: Stone masons, 60 cents; bricklayers, 65 cents; stone cutters, 56¼ cents; tile setters, 50 cents; carpenters, 45 cents; roofers, 45 cents; plasterers, 62½ cents; painters, 45 cents; plumbers, 62½ cents; steam fitters, 60 cents; electricians, 46⅞ cents; lathers, 4 cents per yard or 50 cents; sheet metal workers, 35 to 47½ cents. (As graduated by the master steel metal workers.)

Reinforcement for Concrete.

With all the desirable qualities possessed by concrete, there are two disadvantageous ones which, if not correctable, would decidedly limit the application of this material. Its resistance to tension and shearing are low. With its ability to withstand weather changes, fire, internal deterioration, resist compression, its suitability for molding and moderate first cost, it would be unfortunate if the two undesirable characteristics could not be removed to a large extent. The want of cohesion between its particles is at least partly compensated for by using steel reinforcement. The adhesion between steel and concrete is very strong, but this is scarcely to be relied on for severe service, so in the best practice the aim is to secure a mechanical bond by forming the steel reinforcement, so that the tensions and shears imparted to the concrete will be mechanically transmitted to the steel, says a late issue of *The Iron Age*. Ultimate dependence is thus put upon the metal. It should practically be so dimensioned as to sustain the whole of the shearing and tensional strains.

In bridge work in Philadelphia the authorities require that the bond between concrete and reinforcement shall be a mechanical one. That is, that there should be an interlocking of shapes, no particular dependence being placed on adhesion. Such reasons are the ones which require that rods intended for reinforcement shall be square originally and then twisted, or shall have protuberances. By such devices, a tensional strain will be transmitted with some effectiveness to the rod—and that is where it must be sustained. Further, to secure a mechanical bond, rods are bent and intertwined with others.

The possibility of using steel for reinforcement depends upon the remarkable fact that the co-efficient of expansion of steel and concrete are approximately the same. If this were not the case, it would be impossible to combine the two with success. If with a 50-degree change of temperature there should be any appreciable inequality of expansion or contraction then there would result a breaking up of the original solidarity.

A matter of importance is the life of the reinforcement. Concrete properly made is practically indestructible by the weather. The Pantheon at Rome, rebuilt 123 A. D., is still standing, and presents for examination its great dome of concrete. This has a span of nearly 150 ft. The question is, Will steel imbedded in concrete last indefinitely? Probably there is not at present available sufficient evidence to settle this question finally. A piece of iron—not steel—has been found which was probably imbedded in the original concrete of the Pantheon and is in a good state of preservation. What the conditions were when it was imbedded and whether they are being repeated now is not known. Reinforced concrete construction is relatively modern, and practically no data exist to settle the question of its endurance under modern conditions.

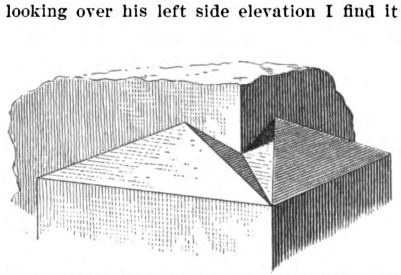
THE National Association of Cement Users has just issued from the office of the president in the Harrison Building, Philadelphia, Pa., a circular addressed to the members of the organization and relating to various matters of interest, prominent among which are insurance rates. The extreme desirability is pointed out that the list of insurance rates on various classes of cement structures should be as large and cover as great a variety of building as possible, and the circular is sent out for the purpose of securing the co-operation of the members of the association in the extensinn of the present list, which is particularly deficient in rates of insurance on buildings in which artificial stone and hollow cement building blocks are used. The president requests the members to send in the names and addresses of the owners, architects and contractors of any building in the locality of the sender in which cement is largely used.

CORRESPONDENCE.

Criticism of First Prize Design in Bungalow Competition.

From M. R., Sturgeon Bay, Wis.—Having just received the June issue of *Carpentry and Building* and read Mr. Fidler's reply to my criticism of the first prize design in the Bungalow Competition I would say in answer to his suggestion that I write more specifically concerning the roof plan over the window seats—that I am sending a small model of that particular corner of his roof. This model is not to any scale or proportion in connection with the plan, but was made simply to illustrate a valley that Mr. Fidler apparently failed to incorporate in his drawings.

In looking over his left side elevation I find it is almost impossible on account of the barge board to show the elevation of the front part of the roof exposed above the exterior hip on the left side. Now this does exist, as will readily be apparent by looking at the model which I send when placed on a level with the eye and vice versa, looking at it from the front. I suppose I should have made a drawing of this, but I am real busy trying to kidnap a gang of carpenters to go north to work on a bungalow that is of more interest to me just at the moment.



View of Model Submitted by "M. R.," Showing Roofs Over Window Seats in Living Room of Bungalow.

Note.—We have made a picture of the model furnished by the correspondent above, showing the roof construction directly over the window seats at the front corner of the living room of the bungalow in question.

A Complimentary Letter from an Old Reader.

From Hee H. See, Sacramento, Cal.—I have been wanting for some time past to find opportunity to compliment the editor upon the present appearance of *Carpentry and Building*. My files go back to the year 1891 and, though there have been many excellent articles and serials during the period since then, the volume for 1909 is in my estimation the banner of them all. Mr. Joslin's articles on "System in the Execution of Building Contracts" have appealed to me very strongly, and I should hate to miss a single issue, while the staircasing articles by Morris Williams are about the finest things in that line that I have ever seen.

Feeling as I do with regard to the paper which I wish continued and increasing success in its policy of educating the younger and even some of the older element in the building line, some of the readers critically inclined may raise the question why my *nom de plume* does not appear oftener in the correspondence columns. To this I would say that while my inclination to contribute is strong the demands upon my time are such as to preclude anything more than an occasional letter of comment.

I might mention that my present job with a railroad company keeps me fully occupied 10 hours per day, six days in the week. Often when the day's work is over—that is, over for the other fellows—your humble servant must sit until nearly bed time making out reports and entering up time and material.

Our work is so varied that the man in charge must generally stay with his men every working minute of the day and not infrequently do two men's work himself. In the course of a year, or even in the course of a few months, we may possibly do a little of every known class of building work from reinforced concrete to corrugated iron. How many of my brother chips know the best way to cut corrugated iron where it runs up to the gable end.

We have just completed a job in which we took down two 17,000 gallon water tanks and erected them again at another station. My men are good mechanics—all of them—but not one had ever done any of this class of work before, so the reader may easily imagine that my time was pretty well occupied.

I maintain now, as always, a strong friendly feeling for *Carpentry and Building*, which has done so much for us in the trade and I think we ought to come forward a little more frequently with a word of praise for our worthy editor, whose time and energy make possible such a valuable department as the correspondence pages of the paper.

For myself, I hope the opportunity to send along a letter of comment will occur a little more frequently in the future than it has in the past. If there are any readers who hope the same or who hope differently I trust they will not be bashful, but will step up and say so.

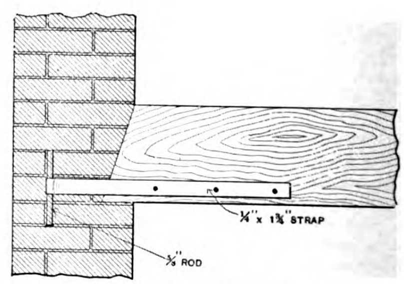
Some Questions in Brick Wall Construction.

From L. K., Cragsmoor, N. Y.—I notice in the June issue of the paper that "T. K.," Cazenovia, Wis., asks a number of questions regarding brick wall construction, and I offer the following suggestions as of possible help to him.

A wall 20 ft. high for a residence building should be 12 in. thick for the first story and 8 in. for the second story, provided the house is not over 26 ft. wide. For a building 32 ft. wide, such as "T .K." mentions, the walls should be 4 in. thicker, making them 16 in. for the first story and 12 in. for the second story.

The sketch which I send will show how the floor joists are anchored to the brick wall. Notice that the end of the joist is cut aslant, so that in case of fire the falling of the beam may not tear the wall more than necessary. The tie or anchor is spiked to the lower part of the timber for the same reason. These ties are usually spaced 6 ft. or less apart.

Woodwork may readily be fastened to a wall if wooden brick are laid in the wall at intervals during construction. Porous terra cotta brick also make excellent nailers, but cannot always be readily obtained. If wooden brick are used they should be a trifle longer on the inside edge, in order to prevent pulling out. It is seldom necessary to fasten baseboards directly to brick walls, as they are usually furred and lathed on the inside, but they may be fastened to wooden nailers, as explained above, or expansion bolts or screws may be used.



Some Questions in Brick Wall Construction.

Weatherboarding a Circular Bay Window.

From M. C. H., Atlantic City, N. J.—Will some of the readers of *Carpentry and Building* kindly advise me as to the rule for applying siding to a circular bay window?

A Question in Rafters.

From W. H. P., Philadelphia, Pa.—May I ask some one of the many readers of the Correspondence columns if the length of the common rafter in a roof of 45 degrees pitch represents the run of the hip rafter, why will not the length of the common rafter in a roof of one-third pitch represents the run of the hip rafter? Let the correspondent making answer to this query please show the reason by means of a diagram.

Stress Diagram for Plank Barn Truss.

From Robert C. Noerr, C. E., Hartford, Conn.—In the May number of *Carpentry and Building* "C. P. K." undertakes to furnish a stress diagram for a "plank frame barn truss." As the diagram given violates every principle of "graphics," I beg leave to submit the following solution as indicated by the blue print enclosed. In this I use the same truss and loading (Fig. 1) as "C. P. K." and the same letters as far as they will go. The dimensions shown are assumed, as their relative and not their actual value is of importance at the present time. The members shown dotted do not logically form a part of the truss and will be omitted in the following discussion:

The bent shown in Fig. 1 is really a "three-hinged arch," hinged at the points x, y and z, and as such will have in addition to the usual vertical reactions horizontal reactions acting at the hinges x and z. These reactions are due to the tendency of the arch to settle at the peak and kick out at the bottom. The vertical reactions are each equal to half of the total load on the bent, or 2000 lb.

The horizontal reactions are most easily obtained by "moments," taking the center of moments at y, thus:

$(2000 \times 20) - (1000 \times 11.5) - (500 \times 20) \div 33 = 560 + 1$ lb.

The stress diagram shown in Fig. 3 has been drawn for the left hand truss only, both trusses being alike for the loading shown. It is first necessary to indicate all the force upon the truss and this has been done in Fig. 2, where the right hand truss has been removed and a horizontal reaction applied at y to hold it in equilibrium. This horizontal reaction is equal and opposite to the one found above (C-I, Fig. 2).

The stress diagram, Fig. 3, has been based upon the forces thus obtained and shown in Fig. 2. It must be remembered, however, in using the above method that the bent must be so framed as to really act as a truss; that is, the joints must be so framed as to properly transmit the stresses from one member to another.

My opinion is that the way these barns are usually built there is no real truss action in the bent, and what we really have is a pair of rafters crossed and braced to the side posts, the members A-F of Fig. 2 being merely one of the secondary rafters, of which there are usually five or six between each pair of bents. In that case the critical point to be figured would be at the point where the rafters cross and where there will be a tendency to bend, as at w of Fig. 1.

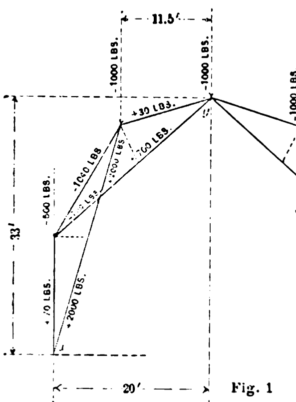


Fig. 1

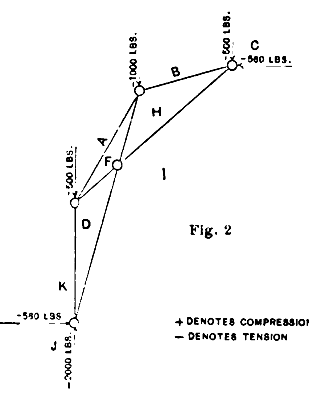


Fig. 2

Fig 1.—Elevation of Bent.
Fig. 2.—Showing Forces Exerted Upon the Truss.

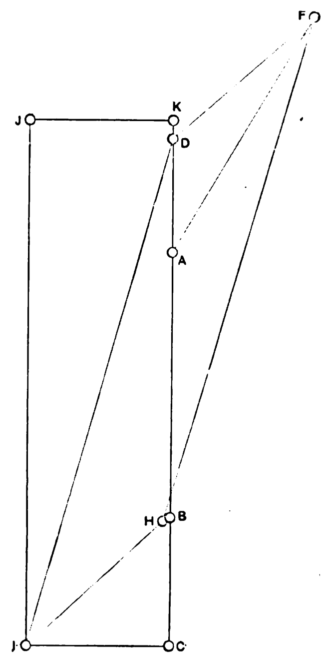


Fig. 3.—The Stress Diagram.

Stress Diagram for Plank Frame Barn Truss.

Action of Frost on Concrete Wall.

From L. H. Hand, Kenilworth, Ill.—Replying to the question of "H. L. E.," Newport, Maine, in the June issue, I would say that, so far as I have noticed ordinary residence foundations in this section, there are no battered walls put in. I have never seen a well built concrete wall affected by frost, but the subject is one well worth investigation, and I think a contribution from any experienced builder on all phases of the subject would be of general interest.

In January of this year I put in a foundation during freezing weather, some of the wall freezing just a little. Those portions turned milky white, but the wall when dry was as hard as could be desired. I was told of a case where an entire wall was put in one day and during the night it froze solid. When the casing was taken off the wall was soft and crumbled at the touch, and naturally was condemned. The person doing the work began to haul gravel in order to put in a new wall, but neglected to tear out the frosted concrete. After four or five days the wall was found to be hard, and at the time I talked with the builder he said, "You could not cut it with a cold chisel." This of course was absurd, but the wall is standing all right.

Now, Mr. Editor, I wish to offer an apology to farmers generally, as I stated in my article in the May issue, something to the following effect: "Some people, especially farmers, think any old board is good enough to make a casing for concrete." I am a farmer myself, in that I hold a deed for 147 acres of land on which I reside, and we utilize every board or piece of lumber on the farm for some purpose or another. By the old method a thick or thin board makes a rough place in the concrete, but by the method I was trying to describe any board may be used by boring pinholes to suit the thick or thin end. "God speed the plow!"

Problems in Roof Framing and Bracing.

From W. A. B., Charlotte, Mich.—Brother "J. F. W." of Austin, Texas, asked some very pertinent questions in the February issue in regard to which very few carpenters are correctly informed, and I beg permission to present a few comments thereon. In the first place, his Fig. 1 is incorrectly drawn. The valley which he shows on his plan I have omitted from Fig. 1 of my diagrams, and in its stead have inserted the hip rafter B C, which, I think, will give to the roof a much better appearance. roof and A D E the hip. For the top cut of the hip rafter on the side toward G of Fig. 1 take the lengths A C (12 ft.) and A H (10½ ft.); mark by 10½.

For the top cut on the side of the roof toward F take A B (9 ft.) and A I (14 ft.); mark by 14.

It will be noticed that the figures represent the run of the common rafter on the side next to which we wish to make the cut and a length of the hip rafter corresponding to the run of the opposite side. It will be remembered that the brother wanted the cuts made to fit along the ridge on either side. The usual way is to cut the hip rafter to fit between two common rafters. To make the cut in this way use the same figures as above, but mark on the opposite half of the back, making a point on the

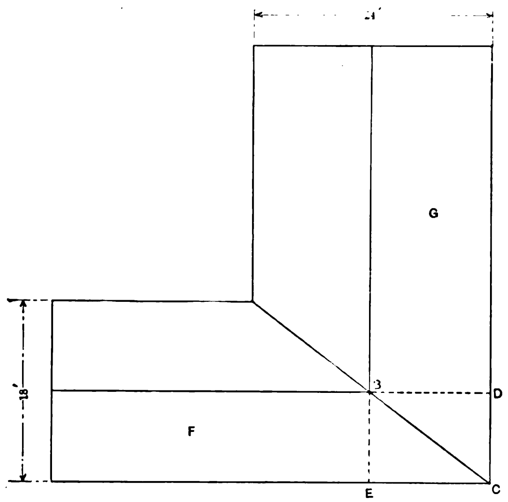


Fig. 1.—Plan Showing Roof Arrangement.

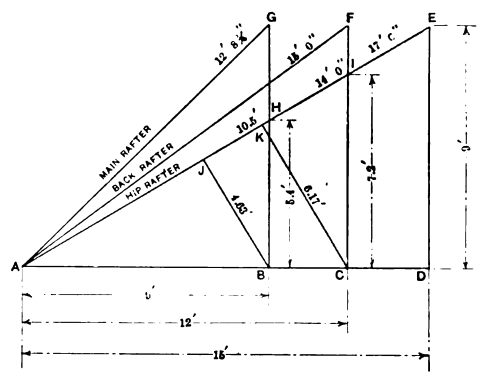


Fig. 2.—Diagram Showing the Run, Rise and Pitch of Both Roofs.

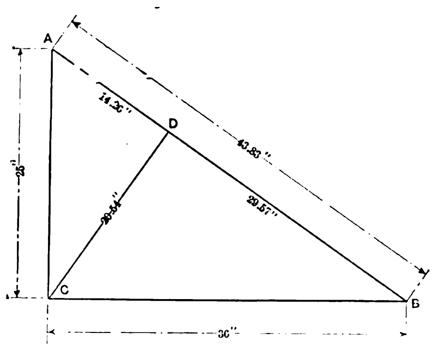


Fig. 3.—Solution of Brace Problem.

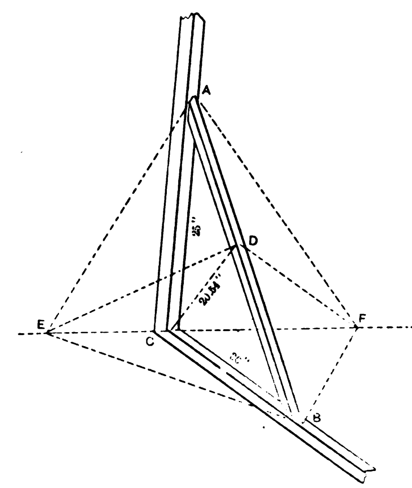


Fig. 4.—Perspective View of the Brace Problem.

Problems in Roof Framing and Bracing.—Diagrams Submitted by "W. A. B."

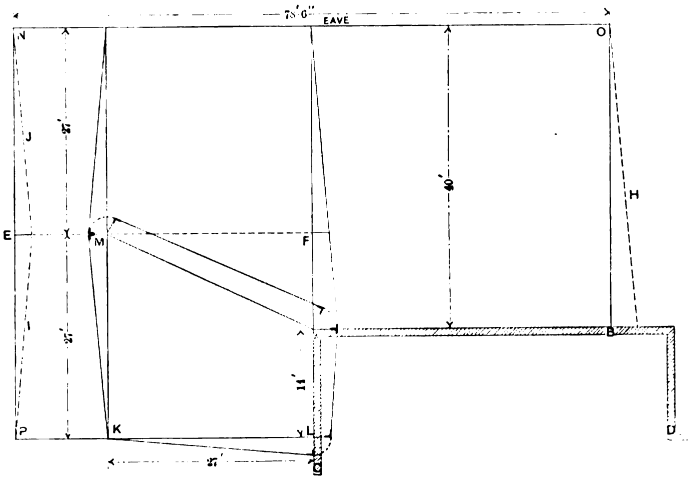
Now if the hip rafter is "backed" before making the top cut, then for the top bevel on the side G the figures on the square will be the length of the common rafter on that side of the roof (15 ft.) and the tangent C D (9 ft.); mark by 9. For the top cut on the side toward F the figures will be the length of the rafter on that side (12 and 8¾) and the tangent E C (12 ft.); mark by 12.

Now again, if the hip rafter is not "backed" before making the top cuts, and this is evidently what "J. F. W." is getting at, we must take another combination of figures. Right here it must be understood that the back of the hip rafter forms a plane of its own and conforms to neither slope of the adjoining roofs. In order to obtain the correct figures we draw the diagram, Fig. 2, representing the run, rise and pitch of both roofs, as well as the hip, all on the same level line. The right angle triangle A B G represents the main roof, A C F the rear rafter instead of a notch. The side cuts of the hip will be the run (15 ft.) and the rise (9 ft.) of the hip; mark by 9 for the top and by 15 for the foot.

For "backing" the hip rafter, either before or after making the top and bottom cuts, draw the lines J B and K C square from the hip and intersecting the run line at the points B and C, respectively, of Fig. 2. The lines A C (12) and J B (4.63) are in proportion to the figures required—12 for the top and 4.63 for the side toward G; also A B (9 ft.) and K C (6.17 ft.) are in proportion to the figures required for the bevel on the side toward F—9 for the top and 6.17 for the side.

Regarding the second problem of the correspondent the two planes of the back or top sides of the brace may be treated as two separate hip roofs. First draw a line square from the top of the brace to the angle C, as indicated by D C, in Fig. 3 of the sketches. This line would represent the run of either roof, and A D and D B would be the tangents for either roof—A D for the top of brace and D B for the bottom end.

Referring to Fig. 4, draw lines from D to meet the angle C at E and F on either side. These lines and their lengths represent the lengths of the imaginary common rafters on either side of the brace and are obtained by laying the angle of the square over the back of the brace at the point D, with the blade and tongue directed toward E and F, respectively, in the angle C. The lengths of these lines will depend on the "roll" of the brace.



A Deck Roof Problem.

This work can be readily laid out at an angle between a wall and floor at a distance from any corner sufficient for room in which to work. Fig. 4 gives a sort of perspective view. The triangles A B E and A B F may be imagined as two separate roofs, the line A D B being the plate line for either. It will be seen that A D and D E make the bevel at the left of A; mark by A D. Then A D and D F make the bevel at the right of A; mark by A D. Again B D and D E make the bevel at the left of B; mark by B D. Further B D and D F make the bevel at the right of B; mark by B D.

The bevels on the under side of the brace are paralleled to the braces on the opposite side of the piece and are obtained by the use of the same figures.

In regard to the third problem of the correspondent, I would say, take the run of the "lookout" on one side of the square and a length of main rafter corresponding to the rise of the lookout on the other side. For example, suppose the run of the lookout rafter is 12 in., then for one-third pitch the rise would be 8 in. A length of the main rafter corresponding to a rise of 8 in. is 14 5-12 in. for one-third pitch and 17 in. for one-half pitch. For the face cut of plancier on the one-third pitch roof use 12 and 14 5-12; mark by 14 5-12. For one-half pitch roof use 12 and 17; mark by 17. The edge cut is the run and rise of the main rafter, marking by the run.

A Deck Roof Problem.

From C. J. M., St. Johns, Newfoundland.—A short time ago there came under my notice a deck roof problem which may possibly be interesting to some of the readers of the paper. The diagram which I send herewith shows the plan of a flat roof or deck abutting against an upright wall, the pitch of the roof being indicated by the dotted lines at H. I and J. The conditions attending the framing of this deck was that it should run up from the eave to meet the wall, thus forming a level line from A to B. It was also required to have the deck fall both ways from E, which would form a ridge from E to F. Now, if this was done, there would be a triangular piece of upright wall formed from A to F, which would be an exceedingly difficult place to keep tight.

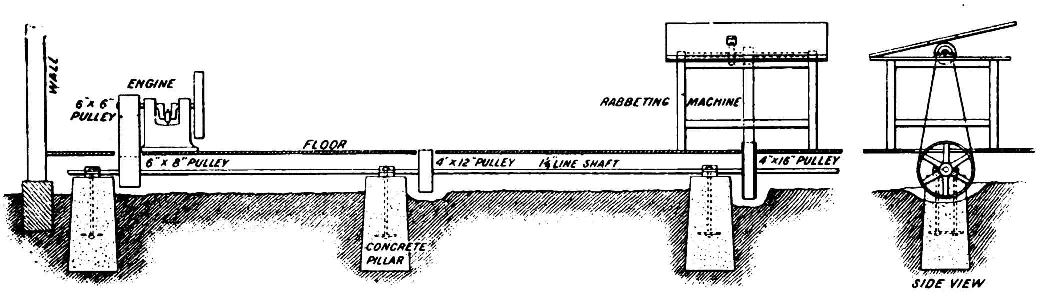
After due consideration of all the conditions it was decided to slope up from K to L equal to the pitch from K to M and swing the ridge around from F to A, raising it at that point to the same hight as the joist running up from the eave.

All this is clearly shown in the diagram. By imagining the points joined by the dotted arcs brought together in an upright position, it will be seen that all that portion of the roof indicated by the letters E, N, O, B, A. M is in the same plane, and that the portions bounded by the letters E, P, K, M and M, A, L, K are in two other planes, all having very nearly the same pitch.

More Speed Required for Carpenter's Shop.

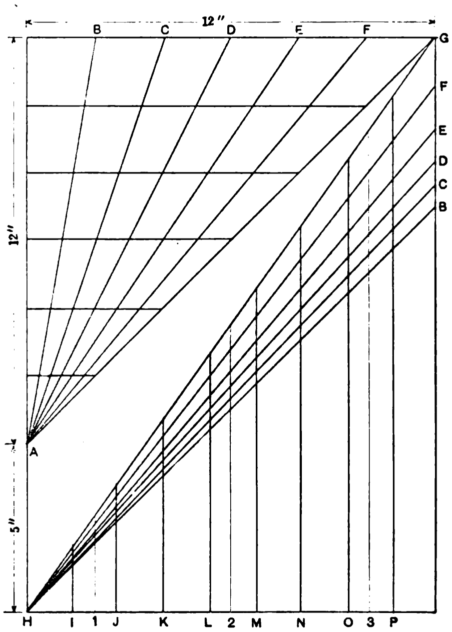
From J. E. D., Milton, Iowa.—I am greatly interested in your valuable paper and would not do without it at twice the cost. I like to read what my brother chips have to say on different subjects, as much interesting and valuable information can be absorbed by any one who carefully follows the columns of the paper through an entire year. I am a great fellow to ask questions, but a very poor one to answer them, as I always think there is some one else who will answer much better than I can, and this seems to have been the case, judging from the few questions which I have propounded through the columns of the paper. It seems as though there is always somebody ready to reply to almost any question that may be presented. I know that in my own case I have never failed to receive a prompt and satisfactory answer to the questions that I have asked.

A short time ago I wanted more power for my carpenter shop, in which the readers will recall the line shaft was placed overhead and belted to a line shaft under the floor and then to the machines, by which arrangement I lost power. Some of the practical readers told me to put the line shaft under the floor and belt direct



More Speed Required for Carpenter's Shop.—Sketches Accompanying Letter of "J. E. D."

to the engine, which I did, and everything has worked just as they said it would so far as power is concerned. Now that I get the power I want the speed, and I come to the practical readers to have them tell me what size pulleys I should use on each machine and what speed they should run at in order to get the best results.



Cardboard Models in Roof Framing.

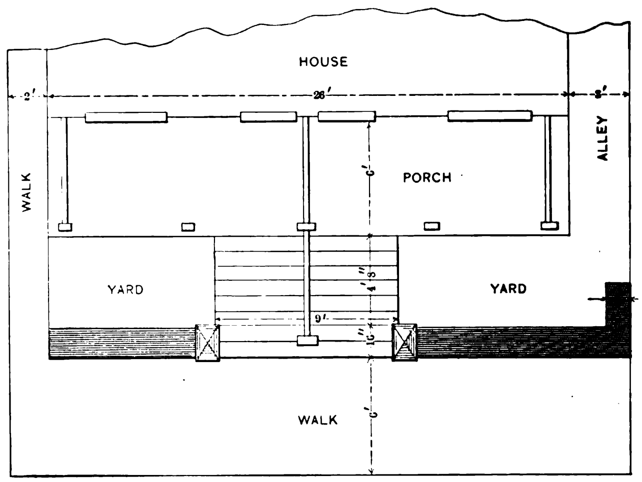
It will be noted from the sketches which I send that I have put the line shaft under the floor, but the shaft does not touch the building at the side walls, so that the frost and wet weather will not interfere with the shaft by the raising or settling of the building. My engine runs 450 rev. per min., and my main driving pulley on the engine is 6 in., belted to the driven pulley on the shaft, which is 8 in. My saw mandrel pulley is 2½ in. and my rabbeting pulley is 3 in. My saw is belted to a 12-in. pulley, which gives very good results. Can they be geared too high and not do justice to the saw? My cutter head for flooring, jambs, &c., is belted to a 16-in. pulley, which was all the pulley I had. This cutter head is a wobble saw 6 in. in diameter, which does good work by giving it a little time, but when it is crowded it leaves the work ragged—that is, not smooth. I think it should run a half faster, but I have never gone to the bother to change the pulley, so I want to hear from my brother chips through the columns of the paper.

Cardboard Models in Roof Framing.

From R. S. S., Cleveland, Ohio.—In the issue for December last was a diagram showing the layout of rafters, also a view of a cardboard model with rafters in position, in connection with a communication from "L. T.," Houston, Texas, which I regard very favorable as an explanation of lengths of hip and jack rafters. I inclose a diagram, however, showing a method which I find works well as a short and simple means of obtaining the lengths and bevels of common, hip and jack rafters on pitches of all kinds, yet it may be an old system to some carpenters. Why not pass it along to the younger class of men to work out. This is why I like *Carpentry and Building*. It brings out problems of different kinds of work with which we come in contact every day. I will say that I first lay out a square 12 x 17 in. in area, place a point back 12 in. as a base, space the 12 in. rise into spaces of 2 in. each and then draw lines from this point as A to B, C, D, E, F, G, which give the lengths of rafters of different pitch in 24 ft. Then draw lines from the 12 in. base 2 in. apart, intersecting with the line from A to G; also all other lines connecting with the 12 in. rise, by which we get the length of rafters of buildings of different width. In order to get the length of hip rafters draw lines from H, which represents the 17 in. base, to G, F, E, D, C, B, for hips of 12 in. rise. Parallel lines, as I, J, K, L, M, N, O, P, intersecting with the line from H to G, spaced 16 in., give the lengths of jacks from all intersection lines. In making the diagram ink of different color can be used to distinguish different lines, in spacing jacks 16 in. and 24 in. centers, as for example, those marked 1, 2, 3 on the diagram. This can be made on good paper or tracing cloth and kept in the toolbox always ready for reference on short notice.

Improving the Appearance of a House Front.

From A. R. C., Pocatello, Idaho.—In the correspondence columns of the April issue "W. G.," Penbrook, Pa., asks for suggestions for improving the appearance of the front steps and yard of his house, elevation and plan of which he has given. It seems to me that the most feasible way of overcoming the difficulties of which he complains is to rearrange his steps and yard in accordance with the plan which I send herewith. As he will note thereon, the unsightly and inconvenient pair of steps at each front corner of his yard leading directly from the sidewalk are dispensed with, and in their stead a straight central flight connects the walk with the porch. This arrangement will give a more symmetrical and dignified aspect to the front elevation, and in many ways will be found superior from the standpoint of utility. It affords a much easier and safer proportion of steps, there being eight steps with a tread of 9 in. and a rise of 7 1-3 in. By encroaching a little upon the sidewalk and increasing



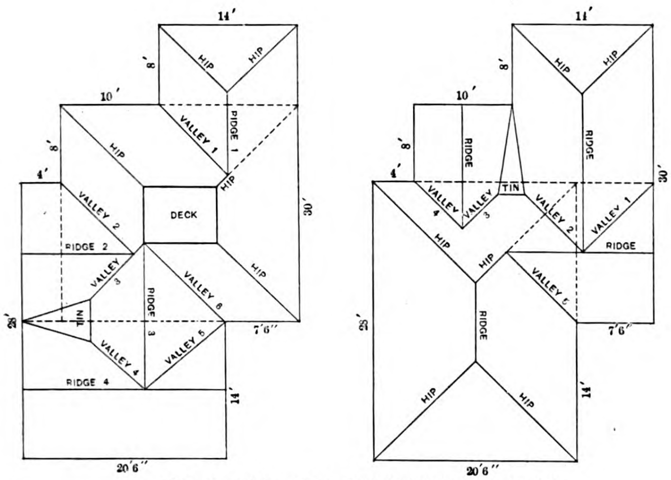
Improving the Appearance of a House Front.

the run as far as permissible a still easier rise can be obtained.

The steps are shown to have a width of 9 ft., allowing 4 ft. 6 in. on each side of the party balustrade. By increasing the width of the flight the apparent hight of the house above the street level will be correspondingly reduced, although, of course, at the expense of yard area. A single flight of steps will produce a much better effect in this case than would two separate flights side by side, as shown in the plan of the correspondent, besides the cost is in favor of the former.

Roof Plans for Dwelling.

From J. E. N., Leland, Ill.—I am sending two plans of roofs, Figs. 1 and 2, in reply to the inquiry of "G. W. G.," Storm Lake, Iowa, in the May issue of the paper. Referring to the plan, Fig. 1, the valley rafter marked 5 does not set at an angle of 45 degrees, but closely approximates it. It is sufficiently near that it will do no harm. I had to extend it beyond 45 degrees in order to have it intersect with ridges 3 and 4. All the rest of valleys and hips are at an angle of 45 degrees.



Figs. 1 and 2.—Plans Contributed by "J. E. N."

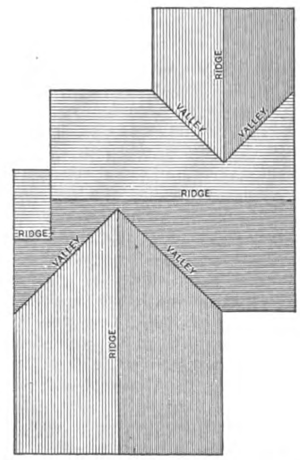
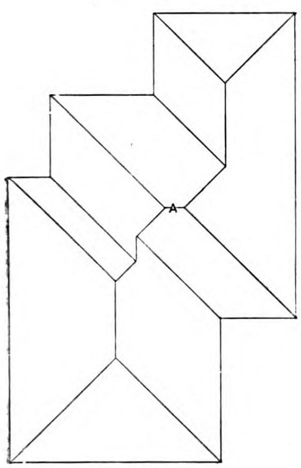
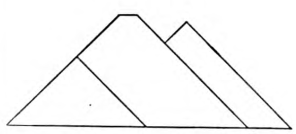


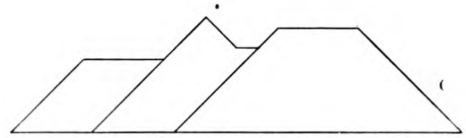
Fig. 3.—Plan Submitted by "M. L. N."



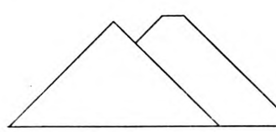
Roof Plan.



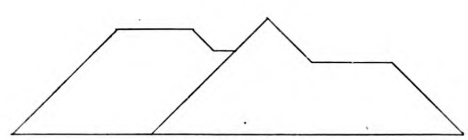
Rear Elevation.



Side (Left) Elevation.



Front Elevation.



Side (Right) Elevation.

Figs. 4 to 8.—Plans and Elevations Contributed by "Kese."

Roof Plans for Dwelling.—Contributed by Various Correspondents.

The plan in Fig. 2 is an alternate construction wherein all hips and valleys are at an angle of 45 degrees. I trust these plans may be of some help to the correspondent in question.

From M. L. N., Washington Court House, Ohio.—I have been a constant reader of your valuable paper for a number of years, and with a view to adding my mite to the Correspondence columns I am sending a roof plan, Fig. 3, in reply to the query of "G. W. G.," Storm Lake, Iowa. I am only sending one plan, although I could furnish several showing different methods of solving the correspondent's problem. The one here shown consists of gables, ridges and valleys. It will be noticed at the left side that there are two gables, one you might say being built in the side of the other.

From Kese, Westover, Pa.—The sketches, Figs. 4 to 8, which I am sending are in reply to the request of "G. W. G.," Storm Lake, Iowa, in the May issue of the paper. The plan shows an all-hip roof, and there can be as many gables added to the plan as the owner may desire. I have omitted the gables so as not to confuse the main outlines of the roof, and would say by way of further explanation that the roof can be made with a deck at "A" with very little change in the plan as shown.

Now if "G. W. G." cannot make out with the solution of the problem here presented he will find that "J. A. K.," Detroit, Mich., knows more about this kind of work than I do, and I suppose would gladly help any one in solving the roofing question.

Trouble with a Secret Box Gutter.

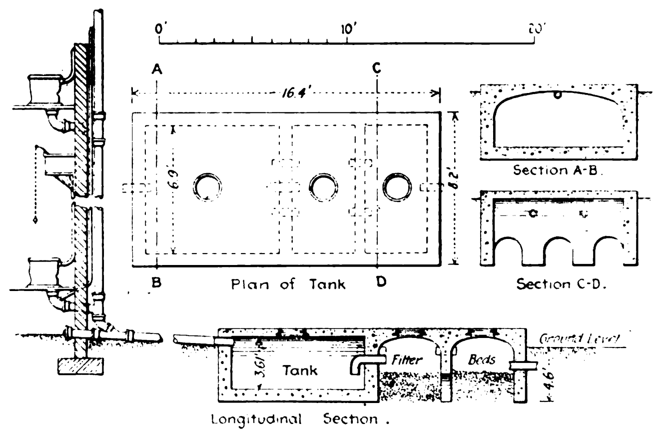
From C. H. B., Worcester, Mass.—I notice the trouble with a secret box gutter described by "W. S.," Moberly, Mo., on page 176 of the May issue, and in reply would state that I successfully repaired a similar gutter last fall by covering all holes that appeared with Webster's elastic cement, and then gave the whole a heavy coat of "Perfect black elastic paint." Parts of this building had settled, leaving standing water in some places 3 in. deep, and which, of course, was frozen the greater part of the winter. Since treating as described no leaks have appeared, and the gutter at the present time seems to be as tight as when first painted. I intend to repeat the treatment every other year.

Septic Tank System for Residences in the Philippine Islands.

During the past decade the Division of Sanitary Engineering of the Bureau of Health for the Philippine Islands has developed a type of septic tank with filter beds for disposing of house wastes. Some account of it was given recently in *Engineering News*, by Geo. H. Guerdrum, Chief of the Division, and the following notes and the accompanying illustration are taken from that journal:

The construction is simple, yet the action of the microorganisms is so complete that nearly all solid matter is effectually reduced to liquid form, rendering the removal of sludge from these vaults necessary at only comparatively infrequent intervals; sometimes not oftener than once in from three to five years. The contents of the flush closets enter the septic tank through the main soil pipe, which for the sake of economy is generally also made to serve as a vent pipe. The custom of submerging this pipe to secure a more thorough top scum has not been adhered to, as it was found that the slight amount of air which followed the sewage into the tank is more of a help than a hindrance to anaerobic bacterial action in the septic chamber.

From the septic tank the contents, partly purified, pass through the submerged iron pipe on to the filter beds. These are what may be called double absorbing filter beds, as there is a concrete baffle in the center, with a final discharge pipe for as much of the purified effluent as is not absorbed by the surrounding ground. In Manila, except in special cases and in outlying districts, all wells and cisterns have been closed, so that the ground may with safety be allowed to absorb as much of the effluent as it will, with the safeguard in this case of a final discharge pipe to prevent the tank from flooding itself. This discharge pipe may be led to the nearest natural drain or street gutter. Manholes are provided for entrance into each chamber for the purpose of cleaning. The two openings are for the purpose of securing a free circulation of air over the entire surface.



Septic Tank and Filter Beds for Residences in Philippine Islands.

The tank is designed for a private house of from 15 to 20 persons. It may be built of either cut stone or brick laid in cement mortar or of concrete, with a reinforced concrete three-centered arched top.

This type of vault has done much to lower the death rate of Manila during the past few years, and has been a useful temporary expedient for the disposal of sewage, pending the construction of a sanitary or separate sewer system for the city. Upon the completion of this sewer system, which is now only a question of months, these tanks will have served their purpose, as the house drainage will then be allowed to discharge directly into the sewers and the sewage disposal will be handled by the municipality. In view of the still all too prevalent custom of many of the smaller cities and towns of the United States of constructing their water works systems many years in advance of adequate sewerage facilities, this design is submitted as a possible means of individual house sewage purification before it is allowed to enter the streams and waterways of the vicinity.

The Introduction of Mahogany.

Like all great things, mahogany had a humble beginning, and like all great things it had obstacles to overcome; yet it won in the end, although receiving a tardy recognition, says a recent issue of the *Hardwood Record*. As Dr. Johnson used to say, " For buried merit raise the tardy bust." So with this wood, not until a long time after it was discovered was it put to its proper use and given honor commensurate with its worth.

In 1724 a Dr. Gibbons received from the West Indies a few planks of mahogany. At the time he was erecting a house on King street, Covent Garden. He endeavored to have the carpenters use the planks on the work. They attempted to, but they complained that the wood was so hard a steam hammer would be required to drive the nail. They of course turned it down. The doctor next took the mahogany to his cabinetmaker, Wollaston, and directed him to make a candle box out of the planks. This was done only after much fussing and cavil, but when the article was finished it so outshone the other pieces of furniture in the doctor's house that he was actually ashamed of his older stuff. Wanting to please royalty, the doctor had a bureau made too from the " new wood " and presented it to the Duchess of Buckingham. It made a hit, of course, and in short time the doctor, the cabinetmaker and the mahogany were made famous.

It was Sir Raleigh, however, who was the original mahogany man. In addition to giving civilization the smoke habit, and precedents in daring and gallantry, he was the first man to discover the wood and put it to commercial purposes. This use, though, was of a baser sort, and confined to shipbuilding. Imagine a sailing schooner, a galley or an old Spanish treasure ship made from mahogany; it is almost as bad as utilizing walnut for ties. If the old time buccaneers only knew the vast value there was in mahogany they would have thrown the Aztec treasures overboard and utilized the mahogany ship itself; but, being ignorant freebooters, they were penny-wise and pound-foolish.

Even as far down in history as 1840, a Liverpool firm, Chaloner & Fleming, endeavored to promote mahogany as a material for shipbuilding. They went so far as to give their freakish notions publicity in pamphlet form. When gold was discovered in California, diamonds were found on the Isthmus of Panama while en route to the Golden Gate, but so intent were the seekers after the yellow stuff that they passed up the diamonds and went forward after gold. They mentioned the fact, though, that there was a vast mahogany growth on the Isthmus, and Chaloner & Fleming, hearing of it, took a still more radical step and insisted in a booklet that mahogany, now that it was available in large quantities, should be used exclusively in shipbuilding.

Columbus discovered America, but insisted the earth was a mere earth wart instead of a continent. So those Liverpool folks pushed mahogany onto the market, though barking up the wrong tree in the mahogany utilization.

A BUILDING of reinforced concrete with brick walls, and giving practically 5½ acres of floor space, is about being erected for the Eastman Kodak Company at Rochester, N. Y. The building will cover a ground area of 330 x 350 ft., a portion being two stories high and the remainder three stories high. The contract for the work has been awarded the Ferro-Concrete Construction Company of Cincinnati, Ohio.

Standard Specifications for Portland Cement Sidewalks.

THE extent to which Portland cement sidewalks are being laid at the present day renders especially pertinent and interesting the standard specifications for such construction recently adopted by the National Association of Cement Users. In the introduction the statement is made as to materials that the cement shall meet the requirements of the specifications for Portland cement of the American Society for Testing Materials and adopted by the Association of Cement Users in January, 1906. The specifications continue in the following words:

Fine aggregate shall consist of sand, crushed stone or gravel screenings, graded from fine to coarse, passing when dry a screen having ¼-in. diameter holes, shall be preferably of silicious materials, clean, coarse, free from vegetable loam or other deleterious matter, and not more than 6 per cent. shall pass a sieve having 100 meshes per linear inch.

Mortars composed of 1 part Portland cement and 3 parts fine aggregate by weight when made into briquets shall show a tensile strength of at least 70 per cent. of the strength of 1.3 mortar of the same consistency made with the same cement and standard Ottawa sand.

Coarse aggregate shall consist of inert material, graded in size, such as crushed stone or gravel, which is retained on a screen having ¼-in. diameter holes, shall be clean, hard, durable and free from all deleterious materials. Aggregates containing soft, flat or elongated particles shall be excluded.

The maximum size of the coarse aggregate shall be such that it will not separate from the mortar in laying and will not prevent the concrete fully filling all parts of the forms. The size of the coarse aggregate shall be such as to pass a 1¼-in. ring.

Water shall be clean, free from oil, acid, strong alkalies or vegetable matter.

Forms.

Forms shall be free from warp, and of sufficient strength to resist springing out of shape. All mortar and dirt shall be removed from forms that have been previously used.

The forms shall be well staked to the established lines and grades, and their upper edges shall conform with finished grade of the walk, which shall have sufficient rise from the curb to provide proper drainage; but this rise shall not exceed ⅜ in. per foot, except where such rise shall parallel the length of the walk.

All forms shall be thoroughly wetted before any material is deposited against them.

Size and Thickness of Slabs.

Slabs shall not contain more than 36 sq. ft. or have any dimension greater than 6 ft. For greater area, slabs shall be reinforced with ¼-in. rods, not more than 9 in. apart, or other reinforcement equally as strong.

The minimum thickness of the pavement shall not be less than 4 in.

Sub-Base.

The sub-base shall be thoroughly rammed, and all soft spots removed and replaced by some suitable hard material.

When a fill exceeding 1 ft. in thickness is required, it shall be thoroughly compacted by flooding and tamping in layers of not exceeding 6 in. in thickness, and shall have a slope of not less than one to one and a half.

The top of all fills shall extend at least 12 in. beyond the sidewalk.

While compacting, the sub-base shall be thoroughly wetted and shall be maintained in that condition until the concrete is deposited.

The concrete for the base shall be so proportioned that the cement shall overfill the voids* in the fine aggregate by at least 5 per cent., and the mortar shall overfill the voids in the course aggregate by at least 10 per cent. The proportions shall not exceed 1 part of cement to 8 parts of the fine and course aggregates.

When the voids are not determined, the concrete shall have the proportion of 1 part cement, 3 parts fine aggregates and 5 parts coarse aggregates. A sack of cement (94 lb.) shall be considered to have a volume of 1 cu. ft.

Mixing.

The ingredients of concrete shall be thoroughly mixed to the desired consistency, and the mixing shall continue until the cement is uniformly distributed and the mass is uniform in color and homogeneous.

a. Measuring Proportions. Methods of measurement of the proportions of the various ingredients, including the water, shall be used which will secure separate uniform measurements at all times.

b. Machine Mixing. When the conditions will permit, a machine mixer of a type which insures the proper mixing of the materials throughout the mass shall be used.

c. Hand Mixing. When it is necessary to mix by hand, the mixing shall be on a watertight platform and especial precautions shall be taken to turn the materials until they are homogeneous in appearance and color.

d. Consistency. The materials shall be mixed wet enough to produce a concrete of such a consistency as will flush readily under light tamping, and which, on the other hand, can be conveyed from the mixer to the forms without separation of the coarse aggregate from the mortar.

e. Retempering. Retempering mortar or concrete, *i. e.*, remixing with water after it has partially set, shall not be permitted.

Placing of Concrete.

a. Methods. Concrete after the addition of water to the mix shall be handled rapidly to the place of final deposit, and under no circumstances shall concrete be used that has partially set.

b. Freezing Weather. The concrete shall not be mixed or deposited at a freezing temperature unless special precautions are taken to avoid the use of materials containing frost or covered with ice crystals, and in providing means to prevent the concrete from freezing after being placed in position and until it has thoroughly hardened.

Sidewalks shall be laid in such a manner as to insure the protection of the pavement from injury due to changes in foundations or from contraction and expansion.

Workmen shall not be permitted to walk on freshly laid concrete, and where sand or dust collects on the base it shall be carefully removed before the wearing surface is applied.

Wearing Surface.

The wearing course shall have a thickness of at least 1 in.

The wearing surface shall be mixed in the same manner as the mortar for the base, but the proportion one cement to two of fine aggregate, and it shall be of such consistency as will not require tamping, but will be readily floated with a straight-edge.

---

* To determine voids, fill a vessel with sand and let net weight of sand equal B. Fill same vessel with water and let net weight of water equal A.

$$\text{Per cent. voids} = \frac{A \times 2.65 - B}{A \times 2.65} \times 100.$$

This formula may also be used in determining voids in crushed stone and screenings by substituting for 2.65 the specific gravity of the stone.

The following is a more simple method for determining voids in coarse aggregate. Fill a vessel with the aggregate and let net weight equal B. Add water slowly until it just appears on the surface and weigh. Let net weight equal A. Fill some vessel with water and let net weight equal C.

$$\text{Per cent. voids} = \frac{A - B}{C} \times 100$$

Use a vessel of not less than one-half (½) cubic foot capacity. The larger the vessel, the more accurate the result.

The wearing surface shall be spread on the base immediately after mixing, and in no case shall more than 50 min. elapse between the time than the concrete for the base is mixed and the time that the wearing course is floated.

After being worked to an approximately true surface, the slab markings shall be made directly over the joints in the base with a tool which shall cut clear through to the base and completely separate the wearing courses of adjacent slabs.

The slabs shall be rounded on all surface edges to a radius of not less than ½ in.

When required, the surface shall be troweled smooth.

The application of neat cement to the surface in order to hasten the hardening is prohibited.

On grades exceeding 5 per cent., the surface shall be roughened. This may be done by the use of a grooving tool, toothed roller, brush, wooden float or other suitable tool; or by working coarse sand or screenings into the surface.

Where color is used it shall be incorporated uniformly and the quantity and quality shall be such as to not impair the strength of the wearing surface.

Single-Coat Work.

Single-coat work shall be composed of one part of cement, two parts of fine aggregate and three parts of coarse aggregate, and the slabs separated as provided for in the specifications for two-coat work.

The concrete shall be firmly compacted by tamping and evenly struck off and smoothed to the top of the form. Then, with a suitable tool the coarser particles of the concrete shall be tamped to a depth which will permit of finishing the walk as under "Wearing Surface."

Protection and Grading.

When completed, the walk shall be kept moist and protected from traffic and the elements for at least three days.

Grading after the walks are ready for use should be on the curb side of the sidewalk, 1½ in. lower than the sidewalk, and not less than ¼ in. to the foot fall toward the curb or gutter. On the property side of the walk the ground should be graded back at least 2 ft. and not lower than the walk; this will insure the frost throwing the walk alike on both sides.

Curbs.

The trench shall be excavated to a depth not greater than the bottom of the curb and a width not greater than the thickness of the curb plus 6 in.

The thickness of the curb shall not be less than 6 in.

After the forms are set about 1 in. of wearing surface shall be placed on the inside of the curb form, then the concrete shall be deposited at one operation and firmly tamped to within 1 in. of the top of forms. The top wearing surface shall then be placed and be of the same composition as that specified for sidewalks.

Joints shall be made three-fourths the depth of the curb, continuous with joints of the sidewalk and in no case more than 6 in. apart.

The forms shall be removed as soon as practical and the faces finished at one operation floating down 6 in. with a 1 to 1 mixture of cement and fine aggregate of sufficient thickness to produce a smooth surface.

Where a combination curb and gutter is required, they shall be cast at the same time and finished at one operation.

Roof Gardens for Hospitals.

Roof gardens and sun parlors promise to be the next innovation in hospital construction, which is probably making more progress than any other class of building construction these days. In the estimation of people who are familiar with the operation of hospitals, there is still much room for improvement, both in the construction and management of these mysterious institutions, says a recent issue of *Construction News*. The suggestion of a roof garden and a sun parlor for the benefit of patients comes up in connection with the prospective reconstruction of the Passavant Memorial Hospital in this city, which when it was erected about 20 years ago was thoroughly modern in every respect, but in a score of years is considered deficient in the estimation of people best competent to judge of the growing demands upon institutions of this kind. There are still some other things in connection with hospitals worthy of consideration. We hear a great deal about the "zones of quiet" for teamsters and others, but what is the use of having a "zone of quiet" when the coal man is unloading his wagon beneath the window of a dying woman or child to provide fuel to keep the institution going, and the light and air courts are filled with the cries of hucksters and the management is deficient? Another thing in regard to hospitals, particularly in Chicago, and in this respect this city is unique. Two of its most famous hospitals, said to be without a superior in either instance in this country, are located adjacent to a gridiron of railroad tracks in one instance, where trains are backing up and switching constantly under way, while in another instance the trains are just getting under full speed or slacking up. One of the hospitals mentioned is St. Luke's at Indiana avenue and Fourteenth street, where probably 1500 locomotives pass to and fro every 24 hr., to which has recently been added an expensive addition involving an expenditure of probably $700,000. The other is the Michael Reese Hospital, one of the best in the world, where probably 1000 locomotives and trains pass every 24 hr. When one sees similar beautiful institutions in New York City, Baltimore and St. Louis, surrounded by large areas of vacant land, beautified with trees and shrubs, where it isn't necessary to have widely advertised zones of quiet, naturally one reaches the conclusion that there is still something more to be achieved in the way of hospital location and construction than prevails in Chicago.

Structural Steel, Standing 12 Years, Shows No Deterioration.

Architectural engineers and architects the country over, says the Pittsburgh *Gazette-Times*, took a lively interest in the dismantling of the Murtland Building at Smithfield street and Sixth avenue, which was torn down recently to make room for Pittsburgh's largest office building.

The building was only 12 years old, yet it was one of the first steel frame structures in the country to be dismantled, and furnished the experts in that kind of construction a chance to prove that their theories regarding the durability of steel have been correct. For the steel in the Murtland Building showed no signs of deterioration; the material was in just as good condition when uncovered to the elements as it was when it was erected 12 years ago. The rivets were tight and even the grillage upon which the beam columns rested, and which was under the ground, was in perfect order.

The Murtland Building structural steel has been sold to a corporation in a West Virginia town, which will reconstruct it, and about it will be another office building that will probably be standing when this generation is dead.

The work of dismantling the building was done by James L. Stuart, constructing engineer. The structure was eight stories high, with a basement, the ground area being 20 x 60 ft. The amount of structural steel in the building was about 150 tons.

A MOVEMENT is under way to improve the entire block front from Twenty-seventh to Twenty-eighth street on Fourth avenue, Borough of Manhattan, N. Y., with 12-story twin buildings, the plans for which have been prepared by Architects Clinton and Russell. The block front is now occupied by 16 old structures, consisting of dwellings, stores and stables, belonging to the Cooper-Hewitt estate. Each of the new buildings will have an avenue frontage of 99 ft., the northerly one, which is to cost $500,000, will extend back 185 ft. on Twenty-eighth street. The south one will cost $400,000 and will extend back practically 167 ft. on Twenty-seventh street. The two-story and attic wooden building at the southeast corner of Twenty-eighth street is said to have been the home of Peter Cooper when his glue factory was near by on Lexington avenue.

SOME PROBLEMS IN STAIRBUILDING.—VIII.

BY MORRIS WILLIAMS.

IN the last issue we showed how to lay out the face mold and find the bevel for a wreath to stand over and above one-quarter turn of a hand rail scroll covering the distance as indicated from *a* to *c* in Fig. 54 of the diagrams. By that operation it was demonstrated that the scroll rail when in position would be the hight of two risers above the curtail step in addition to the hight of the short baluster of the flight adjoining.

In the present article it is the intention to show how to lay out the face molds and find the bevels for wreaths to stand over and above two quarter turns of the scroll, as shown in the plan Fig. 54, from *a* through *c* to *e*. By this method the balusters under and all around the scroll rail will be of equal length with those of the flight which makes the scroll rail to follow the nosing of the steps contained in the scroll curve. The effect of this is to lower the scroll rail to the hight of the baluster above the curtail step in place of having the scroll rail as in the other operation two risers higher.

In Fig. 54 is shown only the center line of the scroll rail, which is all that is required to develop the face molds. The first quadrant is struck with *o* as center, as shown from *a* to *c*; the second quadrant is struck from the point 2 as center, as shown from *c* to *e*.

Both quadrants are inclosed by tangents—the first by the tangents *a b* and *b c*, and the second by the tangents *c d* and *d e*.

To find the elevation of these plan tangents it will be necessary to transfer them to the floor line, *a b* being already on this line. To transfer the other tangents make *b*. *c′*, *d′*, *e′* on the floor line equal to *b*, *c*, *d*, *e* around the plan of the scroll. Now erect indefinite perpendicular lines upon each point on the floor line. This operation is called the "unfolding" of the tangents.

Now measure from the springing point of the scroll plan the hight of four risers, as shown from *a* to *a′*. Place the pitch board of the flight at *a′* and draw the pitch of the flight, as shown to *d″*. From *d″* draw a level line to *e″*. These last lines will represent the elevation of the plan tangents. The bottom line from *d″* to *e″* is shown to be level, and its position is at a hight of half the thickness of the rail above the top of the curtail step. This indicates that the scroll rail when in position will follow the nosing of the steps contained in the scroll curve, and that, therefore, the level portion of the scroll rail will be when in position at the hight of the short baluster of the flight from the top of the curtail step.

We are now ready to draw the face molds for the wreaths. It will be observed that according to this operation the wreath is made in two sections, the top section extending from *a″* to the joint at *c″*, and it will have two equally inclined tangents. The bottom section extends from the joint at *c″* to the joint at *e″*, and has one tangent inclined uniformly with the two upper tangents, while the other tangent is level, as shown from *d″* to *e″* to butt plumb with the level portion of the scroll rail. To transfer these tangents to the face mold and find the angle upon the face mold between them is the main problem in the construction of wreathed hand rails. It was shown in a previous issue how to perform the operation in a case where one tangent is inclined and the other level, also in the same issue how to find the angle between the tangents upon the face mold when the two tangents are inclined.

In Fig. 55 we show how to find the angle between the two inclined tangents *a′ b′* and *b′ c″* of the upper wreath, shown in Fig. 54. If the reader will carefully compare the operation here shown with the one illustrated in Fig. 41 to find the section of an oblique cut made

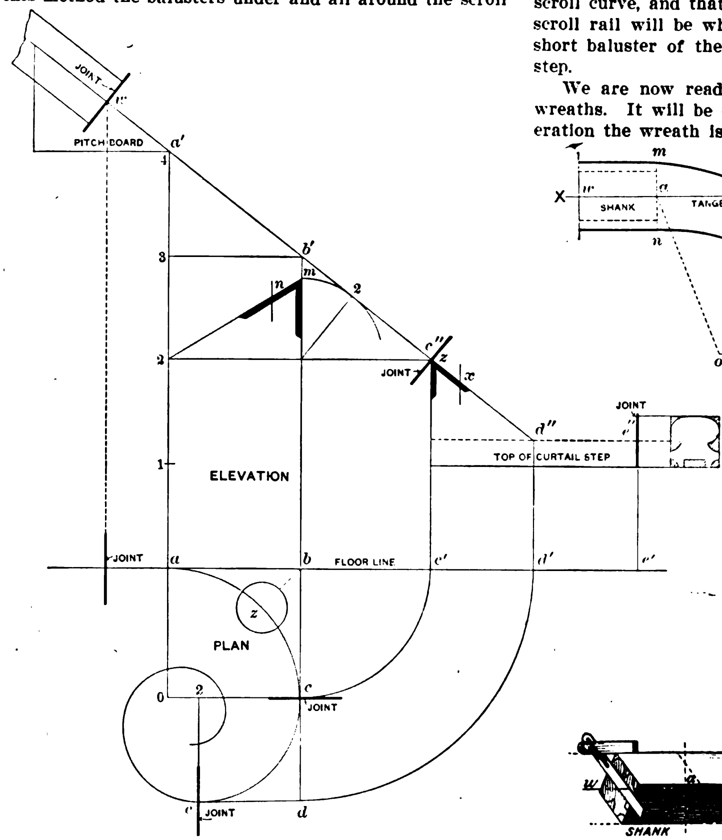


Fig. 54.—Plan and Elevation of Scroll Hand Rail Covering Two Quadrants.

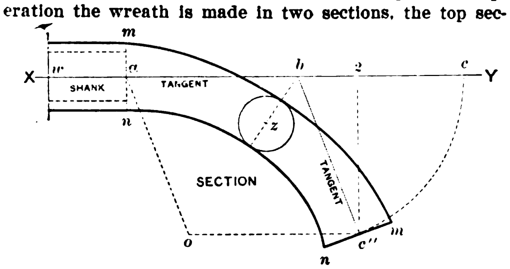


Fig. 55.—Face Mold Drawn by the Use of a Lath Bent to Touch Three Points Found to Be Contained in the Curve.

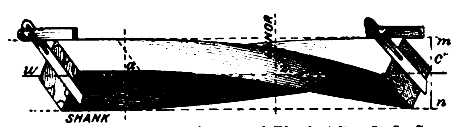


Fig. 56.—The Wreath in Center of Plank After It Is Squared and Showing Application of the Bevels.

Some Problems in Stairbuilding.—VIII.

through a square block he will discover the two to be identical and both exceedingly simple.

Referring again to Fig. 55, draw the straight line X Y. Transfer to it from the pitch line of the tangents in the previous figure the points *w*, *a'*, *b'*, 2 and *c''*. From the point 2 drop a line to *c''*, and connect *c''* with *b*, thus forming the required angle between the tangents *a b* and *b c''* upon the face mold, as indicated at *b*. By drawing parallel lines to the tangents, as from *a* to *o* and from *o* to *c''*, the same section is here shown as in Fig. 41.

To draw the curves of the face mold make *b z* of Fig. 55 equal to *b z* of the plan, Fig. 54. With *z* as a center and a radius equal to half the width of the plan rail, describe the circle, as shown. The diameter of this circle will determine the width of the mold at this point.

The width of the mold at each end is found from the bevel at *m n* of Fig. 54. Place the length of *m n* on each side of *a* and *c''* in Fig. 55, as shown at *n c'' m* and at *n a m*. Now take a flexible lath and bend it so as to touch the points *m* and *m* at each end and the circumference of the circle Z run a pencil aside the bent lath for the outside curve. Again bend the lath to touch *n* and *n* and the circumference of the same circle Z and trace the curve for the inside.

At the end *a* is shown a straight piece added to the mold from *a* to *w*, which is called the shank. This length is the distance from *a'* to *w* of Fig. 54. The joint at *w* is made square to the tangent *a b*, and at the end *c''* to the tangent *b c''*, thus completing the face mold.

To construct the wreath the mold is placed on a piece of plank of sufficient thickness for the purpose and used as a template to cut out of the plank the material for the wreath. It is cut square to the face of the plank all around, including sides and ends; then the bevels are applied to the ends or joints, as shown at *w* and at *c''*, in Fig. 56. The wreath now is to be squared by cutting off the slab of wood from each end to the minor axis at *z*, care being taken in the operation to keep the wreath as shown in the center of the plank.

In Fig. 57 we show how the face mold for the bottom wreath is laid out. This portion is indicated in Fig. 54 from the joint at *c''* to the joint at *e''*. This wreath as shown has the upper tangent *c'' d''* inclined and the bottom tangent *d'' e''* level.

The angle between the tangents as required upon the face mold for a wreath when one tangent is inclined and the other level will always be a right angle. This was demonstrated in Figs. 36, 37 and 38. Referring further to Fig. 57, draw, as shown, the square represented by the letters *c*, *d*, *e*, *o*, in which *c d* and *o e* are made equal in length to the inclined tangent *c'' d''* of Fig. 54 and *d e* and *o c* are made equal in length to the level tangent *d'' e''* of Fig. 54. The angle at *d* in Fig. 57 will be the required angle between the tangents of the face mold to square the joints at each end. The line *o c''* will be the minor axis and the line *o e''* the major axis.

To draw the curves of the mold as in this figure using string and pins, proceed by finding the points on the major axis at which to fix the pins. First make the width of the mold on the minor axis, as shown at 1 2, equal to the width of the plan rail, and the width at the end *e''* equal to twice the length of *z x*, shown on the long side of the bottom bevel in Fig. 54.

To find the points on the major axis to fix the pins for the outside curve take upon the dividers the length *o z* on the major axis, Fig. 57. Fix the dividers in the point *l* on the minor axis and draw the arc *w* indicated by the dotted line, cutting the major axis at the points *a* and *a*, which are called the foci of the ellipse that constitute the curve of the face mold. Fix the pins in these points, as shown; tie a string to each and extend it to *l* on the minor axis. Fix a pencil at this point and sweep the outside curve from *l* to *z*, as shown.

To find the points upon the major axis at which to fix the pins for the inside curve, take in the dividers the length *o x* from the major axis. Fix one leg in the point 2 on the minor axis and draw the arc *s*, indicated by the dotted line cutting the major axis in the points *b* and *b*. Now tie the string to pins at these points, extend it to 2 on the minor axis, place the pencil at this point and sweep the inside curve from 2 to *x*.

Because the tangent *c d* on this face mold is inclined and the tangent *d e* is level, as shown in Fig. 54, it requires only one bevel to square the wreath, which is to be applied to one end only, as shown in Fig. 58 applied to the end *e* and toward the inside of the wreath. The other end *c* is shown to be vertical requiring no bevel, owing to its being on the minor axis.

To understand the whys and wherefores of such a condition the operation of developing a section of this kind, explained in connection with Figs. 36, 37 and 38, should be carefully studied, and in those diagrams the problem here encountered is fully demonstrated. In Fig. 59 we show the method of drawing such a face mold as that indicated in the previous figure by means of "ordinates" or level lines. Draw the square plan *c d e o* to equal the square 2 *c d e* of the plan, Fig. 54. Draw the plan curve of the rail, as shown, from *c* to *c*. From *d* draw the pitch of the inclined tangent, shown at *c'' d''* of Fig. 54, and again from *d* draw the line *d e''* square to the pitch line *d c''*; make *d e''* equal in length to the plan level tangent *d e*. These two lines will be the tangents of the face mold, and at *d* is shown the angle between them, as required on the face mold to square the joints. Make the joint at the end *c''* square to the inclined tangent *c'' d* and at the end *e''* to the level tangent *e'' d*.

Now draw lines (any number) parallel to the level plan tangent *c d* across the plan rail, as shown at 3, 1, 2, &c., and up to the pitch line *c'' d*. From the points on the pitch line where these lines intersect draw parallel lines to the level tangent *d e''* of the face mold. Make each one equal in length to its quadrant plan lines, as shown at 3 1 2 and 3 1 2. Now through the points 2 2 and 3 3, &c., on the section, trace the inside and outside curves of the face mold.

It will be observed that the principle of operation involved in this construction may be applied to the laying out of a face mold for all kinds of wreaths by finding a level line on the plan and the corresponding level line on the section and making the one on the section the same length as the one on the plan. The lines *m n* in Figs. 56 and 58 indicate the thickness of plank required for the wreaths.

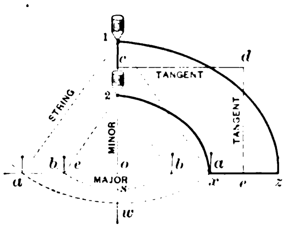


Fig. 57.—Face Mold Drawn by the Use of String and Pins.

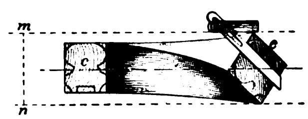


Fig. 58.—The Bottom Wreath After It Is Squared, Showing Bevel Applied to One End Only.

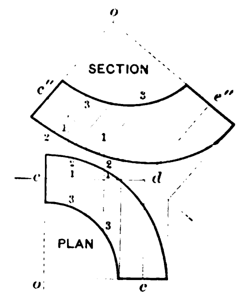


Fig. 59.—Face Mold Drawn by Means of Level Lines or Ordinates.

Some Problems in Stairbuilding.—VIII.

WHAT BUILDERS ARE DOING.

THAT new work in the building line is being projected upon an enormous scale as compared with the same period a year ago is manifest from the reports covering the month of May which reach us from the leading centers of the country. Almost without exception the large cities show important gains over a year ago as regards the estimated cost of the new improvements, for which permits have been taken out. In many localities the work is of a more pretentious character than was the case a year ago, this applying to dwelling houses as well as structures intended for business purposes. A large amount of building is apparent in the smaller places and in the rural districts, where improvements are under way upon a scale which makes for a large aggregate for the entire country.

Here and there minor labor troubles are to be noted in some of the various branches of the building trades, but the friction has not been sufficiently great to seriously interfere with the season's work and everything seems to point to a period of gratifying activity in the building industry.

Atlanta, Ga.

Activity in the building line continues upon a gratifying scale, and new work is being projected to an extent which augers well for the mechanics engaged in the various branches of the trade. The records of the Bureau of Building Inspection show that 397 permits were issued in May for new buildings, additions, alterations, repairs, &c., calling for an estimated outlay of $546,462, which figures represent something over 50 per cent. gain, as compared with May last year, when 341 permits were taken out for new work, estimated to cost $355,056.

President George B. Hinman of the Builders' Exchange of this city has recently made his committee appointments for the coming year, as follows:

Finance Committee: W. B. Disbro, chairman; J. W. Zuber, Moise De Leon; R. M. Walker, ex officio; D. A. Farrell, ex officio.

Membership Committee: H. M. Pearson, chairman; J. B. Dobson, J. N. Harris, D. A. Farrell, ex officio.

Legislative Committee: H. L. English, chairman; Samuel Venable, B. L. Willingham.

Arbitration Committee: C. G. Bradt, chairman; W. B. Parr, B. A. Warlick.

Rooms Committee: V. H. Kriegshaber, chairman; W. H. George, F. J. Cooledge, Jr.

Entertainment Committee: E. J. Putnam, chairman; P. J. Wesley, Fitzhugh Knox.

Public Buildings Committee: George A. Clayton, chairman; W. W. Griffin, R. A. Donaldson, H. L. Stevens, L. P. Hunerkopf.

Acquaintance and New Members Committee: George Ittner, chairman; W. E. Marshburn, S. J. Warner, A. F. Bellingrath, Boyd Perry.

Press Committee: R. S. Wessels, chairman; B. Mifflin Hood, J. W. Leroux.

Industrial Education Committee: George Dowman, chairman; A. R. Colcord, J. H. Deering.

Special Committee to Revise Constitution and By-Laws: R. M. Walker, chairman; D. A. Farrell, V. H. Kriegshaber.

The formal organization of the Master Builders' Association of Atlanta was effected at a meeting of general contractors of the city held about the middle of May in the rooms of the Builders' Exchange. An organization of the contractors of the city is something of which the need has been felt for some time past and it is expected to have a most important bearing upon building conditions in and about the city. It is thought that the organization will tend to make Atlanta distinctive in that it is the home of the only organization of the kind thereabouts and will tend to make the city assume the position of a building center of the South.

Officers were elected for the ensuing year as follows:

President............R. M. Walker.
Vice-President........ William H. George.
Treasurer............ Charles G. Bradt.

J. W. Wood, secretary of the Atlanta Builders' Exchange, has been serving as temporary secretary of the Master Builders' Association and has been actively engaged in perfecting both constitution and by-laws in accordance with certain amendments which have been made.

Baltimore, Md.

One of the noticeable features of the local building situation is the number of two-story brick dwellings for which permits were issued during the month of May. The report of Inspector of Buildings Edward D. Preston shows that 244 of these buildings, each two stories in hight, were planned to cost $414,600 and there were 24 three-story brick buildings projected to cost $99,000. Of two-story frame buildings there were only 12 for which permits were issued, involving an outlay of $34,100. Other features of the inspector's report were five manufactories and warehouses to cost $109,000; three apartment houses to cost $38,000, and a theater builing to cost $25,000.

The total value of the building improvements for which permits were issued was $905,410.80, as against a total valuation of $883,952 in May last year.

At the annual meeting of the Builders' Exchange held on the evening of June 8, the following officers were elected for the ensuing year:

President............Frank S. Chavannes.
First Vice-President...William H. Morrow.
Second Vice-President. H. P. Boyd.
Third Vice-President...John K. How.
Secretary............ I. H. Scates.
Treasurer............ B. F. Bennett.

The meeting was preceded by a dinner served in the banquet hall. At the conclusion of the dinner retiring President Theodore F. Krug was presented a beautiful silver punch bowl 12 in. in diameter and 10 in. high, the presentation speech being made by W. H. Morrow, while Benjamin F. Bennett, who has occupied the post of treasurer for the past 21 years or since the birth of the organization, was given a beautiful seal covered Oxford text Bible, the presentation being made by Israel Griffith.

The members of the Builders' Exchange celebrated the formal opening of its new building at 15 East Fayette street on May 14, the celebration consisting of a public reception, a luncheon, music and a vaudeville entertainment. The reception was held from noon until 2 o'clock, during which time visitors were shown through the building, and then escorted to the fourth floor, where a buffet luncheon was served. In the evening, in addition to the vaudeville entertainment, addresses were made by various prominent members and invited guests.

The exhibition Department of the exchange on the first floor and basement was especially interesting to the visitors, and many were the expressions of appreciation and compliment from those who were present.

The committee having charge of the formal opening of the new building was composed of William H. Morrow, chairman; Charles H. Classen, Harry P. Boyd, Louis F. Young and Morgan Marshall.

Boston, Mass.

It is gratifying to note that the differences recently existing between the contracting builders in Greater Boston and the union carpenters have been amicably adjusted, and what had first threatened to be a serious tie up of operations has been avoided. By the new scale of wages adopted to take effect June 1 the carpenters receive 47¾ cents per hour, which is an increase of 4 cents from the old rate. The schedule calls for Saturday half holidays the year round.

Chicago, Ill.

As reflected by the building permits issued in Chicago during the first five months of this year, valued at $42,189,880, building construction is developing at a rate that bids fair to overreach not only conservative, but the more optimistic forecasts as well. In the corresponding period of 1908 the permits issued were valued at $22,997,050.

In this connection it should be noted that the figures for last year did not reflect the depressing influences that limited industrial activity in other directions, since the total value of permits issued in Chicago during 1908 was greater than ever before in the history of the city. This fact simply emphasizes the remarkable expansion that has taken place in realty improvements.

Marked gains were made in May, as shown in the following record of permits issued by the building department for that month: Number of buildings, 1054; feet frontage, 31,332; estimated cost, $12,609,480, being over $4,000,000 in excess of any other month this year and exceeding by nearly $2,000,000 the record for November, 1908, which established the previous high mark.

Not for a long time have the relations between the labor organizations and building trade employers been as harmonious as they now are. With the exception of the structural iron workers, practically all wage scales have been satisfactorily adjusted for the year, and an amicable adjustment with the organization referred to is looked for at an early date. Altogether the prospects for a prosperous year are most encouraging.

Cleveland, Ohio.

Further improvement in building operations in this city is shown by the report of the city building inspector for May. During the month 721 permits were issued for new buildings, to cost $1,825,539. During April there were 884 permits issued for buildings to cost $1,322,153. During May, 1908, there were 600 permits issued for buildings to cost $668,070.

A large amount of new work is coming out and the amount of construction work during the present year promises to compare favorably with the best year in the city's history.

Indianapolis, Ind

The building season is decidedly active in this city and the new work projected during the month of May goes far ahead of the same month last year; in fact, the record for the city is such as to have been an agreeable surprise to all interested in building construction. According to the figures of Building Inspector T. A. Winterrowd, the total estimated cost of the building improvements for which permits were issued from his office was $1,013,008, as against $370,957 for the month of May last year. One reason for the great increase last month over a year ago was the permit for the $600,000 City Hall building, but even with this eliminated the record exceeds that of the same month of 1908.

A considerable item in the increase for May this year is the erection of dwellings, although there was considerable activity in this line last season, the totals being $274,000, as against $243,610 in May last year. There is a feeling in building circles that the May record would have been greatly augmented but for the law of the last Legislature pertaining to the erection of apartment houses. This law is now undergoing a test in the courts, and while it is undecided very little flat building is likely to be done.

Los Angeles, Cal.

Building in Los Angeles is just about holding its own. The building permits for the month of May numbered 623, with a total valuation of $1,006,764, as compared with 722, with a total valuation of $1,019,000, for the month preceding, and with $830,320 for the month of May last year. While May is usually considered a better building month than April, builders are inclined to feel that the showing made was not bad considering the unsettled business conditions that have prevailed. Of the total building expenditures for the month, about one-third was for concrete and brick buildings and two-thirds for frame construction. The record shows: One reinforced concrete building with a valuation of $22,050; 2 class B buildings, valued at $130,000; 21 class C buildings, valued at $161,995; 231 one-story frame buildings, valued at $284,131; 30 one and one-half story frame buildings, valued at $64,800; 42 two-story frame buildings, valued at $177,852, and a considerable amount of miscellaneous building and alterations.

As to the future there seems to be some uncertainty, though the general idea is that residence building will hold its own pretty well through the summer and fall. A good many builders are turning their attention to outside work, as there is a good deal of activity in some of the outlying cities and towns.

Memphis, Tenn.

The valuation of building operations in May was slightly in excess of that of the corresponding month last year, although the number of permits show a considerable shrinkage, thus indicating that the structures now in progress are of a more pretentious character than heretofore. The records of Building Commissioner Dan C. Newton show that in May of the current year 193 permits were taken out for building improvements estimated to cost $291,251, while in the same month last year 241 permits were issued, covering new work valued at $274,883. Of the work projected last month, $80,873 covered brick and stone buildings, $91,000 covered 16 veneered brick and stone, $79,450 was the estimated cost of 44 frame buildings, and $8250 was the estimated cost of five hollow block structures.

For the first five months of the current year the total value of the new work for which permits were issued was $1,489,545, as against $1,265,700 for the corresponding five months of last year.

New York City.

Building matters have maintained the even tenor of their way during the past month, with the principal feature of interest centered in the discussion of the revised Building Code which has been before the Board of Aldermen for consideration. Eminent architects and engineers have expressed their views on various features of the proposed code and strong protests have been presented as to new fire limits and to the restrictions on reinforced concrete. At the time of writing it looks very much as though final action would not be taken until after the municipal election the coming fall.

The filing of plans for new buildings has not aggregated the total of the month before, but at the same time the volume is such as to indicate a very gratifying condition of affairs. While the permits issued for May in the Borough of Manhattan covered only 102 buildings, yet the estimated cost totaled $13,888,000. In the same month last year permits were issued for 56 new buildings to cost $6,296,400.

In the Borough of the Bronx the increase over a year ago is still more marked, as much construction work in the way of dwellings and apartment houses is in progress in that section of the city. Permits were issued for 243 buildings to cost $4,453,770, while in May last year permits were taken out for 141 new buildings to cost $1,115,750.

Crossing the river to the Borough of Brooklyn it is found that permits were issued for 1014 new structures to cost $6,682,850, these figures comparing with 596 buildings to cost $3,294,241 in May, 1908.

The Borough of Queens continues to break monthly records in the way of building operations, the figures for May being heavier than for any corresponding month since building statistics have been kept in the Building Bureau of that borough. Plans were filed for 411 buildings, costing $1,554,500, while in May last year permits were issued for 307 structures, estimated to cost $846,000. Probably the most significant feature of the current building operations is the heavy increase in the average cost of new dwelling, this being due presumably to a broader demand by those seeking homes in the suburban districts.

For the first five months of the current year plans have been filed in the borough for 1945 buildings, estimated to cost $6,339,500, whereas in the corresponding period last year plans were filed for 1275 buildings, costing $4,303,206.

Oakland, Cal.

The gradual increase in the size of building operations in this city, which has been noted since the opening of the year, continued in May, though the increase was not very large. The valuation of the building permits issued reached a total of $528,183, as compared with $507,120 for April and $445,000 for March. The increase is due entirely to the revival in frame construction, there being practically no large buildings started during the month. Local contractors believe that conditions are favorable to a large amount of residence building in and about Oakland during the present summer.

Materials are low in price, land for residence purposes is available on favorable terms and labor is plentiful. The only fear is that the recent activity in the labor unions may lead to trouble with the building trades. Recently the carpenters' organization made a demand for a $5 minimum wage schedule, to be effective after June 1, but this has been postponed pending joint action between the carpenters of San Francisco and Oakland.

Omaha, Neb.

The month of May showed a record breaking volume of building operations, the valuation of the improvements for which permits were issued being the largest of any month in the history of the building inspector's office. There were 185 permits issued for new work estimated to cost $1,362,195, while in May, last year, 157 permits were taken out for building improvements valued at $393,385. The enormous increase last month over a year ago, however, is readily explained by the permit for the new court house, which is expected to cost $1,000,000. Eliminating this, the record for the month is seen to be less than the same period a year ago.

For the five months of the current year the total valuation of building improvements is placed at $2,981,080, while in the same period last year the total was $1,288,290.

Philadelphia, Pa.

While the month of May in the local building trades did not show as large an expenditure for building operations as was recorded during the previous month, it showed a gain of fully $2,000,000 over that for the same month last year and was only $700,000 behind May, 1907, in which one operation alone costing over $1,250,000 was begun. As a rule May shows a slight falling off from the preceding month, owing to the fact that the rush of the early spring operation work has been completed. On the whole the building situation in Philadelphia continues favorable, the total for the first five months of the year showing an increase, when compared to that for the same period during 1908, of 498 permits for 2482 operations and an increase of $6,987,600 in valuation in favor of the present year, and but $2,000,000 less in value during the same period in 1907.

From statistics compiled by the Bureau of Building Inspection it is to be noted that during May 962 permits for 1984 operations were issued, the total estimated value of which was $4,974,260. Of this total, $1,844,400 is to be expended for two-story dwellings and $931,850 for those of the three-story type, showing a decline of $377,790 for this class of work when compared to that undertaken during the previous month, but when compared with the same month in 1908 a gain of over $1,250,000 is shown. Work on manufacturers' shops and warehouses costing $548,340 was started during May, a gain of over $350,000 when compared to that of the month of April. Tenement and apartment houses are rapidly coming into favor in this city. Operations of this class which have been started during the month will cost in the aggregate over $350,000. Activity in all branches of the trade is more pronounced, mechanics are better employed, and from the work already planned it is evident that active conditions will be maintained for some time, and it is believed that the year in the aggregate will show building operations close to normal.

Portland, Ore.

The building record of this city for May did not keep up to the high standard set by the month preceding, when the aggregate value of the building operations reached $1,-650,500, but it went well above the million dollar mark and indicates that the present year will be the largest from the builder's point of view in the history of the city.

The record for May shows 382 permits for buildings to cost an aggregate of $1,142,400, as compared with $754,000 for the same month last year.

For the first five months, the showing made is $5,441,-235, as compared with $4,046,545 for the same months last year. As in other Coast cities, the improvement in building is due almost entirely to the increase in frame construction. The low price of lumber and the increase in population are acting together to cause an active season in frame residence construction in Portland and the surrounding towns.

Pittsburgh, Pa.

The striking feature of the local building situation is the decrease in the number of permits issued last month for new structures, which, by the way, was the smallest in any May in the past 10 years, while the estimated cost was in excess of any previous May, except in 1901. From this it is quite evident that while operations may be on a somewhat reduced scale this spring, those who are building are putting up better structures than was formerly the case.

According to the figures of Superintendent S. A. Dies 380 permits were issued for building improvements, estimated to cost $2,576,359, while in the same month last year 423 permits were taken out for improvements, involving an estimated outlay of $2,322,315. The permits last month covered 168 new structures, to cost $2,376,865, while in May last year 185 new buildings were projected, to cost $2,141,-385. In May, 1901, which holds the record, 405 new buildings were projected, estimated to cost $4,258,325.

Rochester, N. Y.

Building operations continue upon a large and growing scale, and it is interesting to note the gain in the value of the projected improvements as compared with the same period last year. Many permits for commercial buildings and residences were issued in May, and according to the report presented by Fire Marshall Pierce the total value of the new buildings and improvements was $872,073, while in May, 1908, the total value of the improvements for which permits were issued was $642,485.

In the matter of commercial buildings, the costs range all the way from $35,000 down to $4800, while in the case of dwelling houses there were a large number costing in excess of $4000 each.

San Jose, Cal.

An important meeting of the Builders' Exchange of San Jose was held the last Saturday in May, at which action was taken regarding the building situation in that vicinity. After protracted debate, the following resolutions were unanimously adopted:

"*Resolved*, That, owing to the condition existing in the building industry in San Jose, we find it necessary to fix the minimum wage of all crafts, and recognize only such union scales as were in force previous to April 18, 1906. The above resolution is to take effect June 14, 1909."

Salt Lake City, Utah.

Although the totals for last month as regards building operations were somewhat under the corresponding period last year, the showing for May is considered a good one, owing to the fact that May, 1908, was one of the heaviest months of the year in the building line. The figures compiled in the office of A. B. Hirth, City Building Inspector, show 144 permits to have been issued for building improvements calling for an estimated outlay of $592,000, whereas in May, last year, 100 permits were taken out for new work estimated to cost $601,275.

The impetus given to building operations the last week of May, when 46 permits were taken out for work estimated to cost $115,000, has continued into June and it is expected that the figures for the month will go far ahead of the same month last year, when a total of only $194,900 was recorded.

Scranton, Pa.

The report of Building Inspector E. L. Walter for the month of May and for the first five months of the current year shows a gratifying increase in activity in the building line as compared with the same periods last year. In May 141 permits were granted for new buildings, alterations, repairs, &c., estimated to cost $353,125, while in May last year 96 permits were taken out calling for an aggregated outlay of $142,888.

For the first five months of this year permits were issued for building improvements valued at $801,896, while during the same period last year permits were issued for building improvements to cost $542,307.

Seattle, Wash.

There is continued activity in the building line with an aggregate valuation of improvements projected in May, which is fully one-third larger than for the same month last year. A goodly percentage of the operations is made up of frame structures, both for residence and business purposes, although brick and reinforced concrete work have been by no means neglected. The very interesting figures issued by Francis W. Grant, superintendent of the Department of Buildings, for last month show 1526 permits to have been issued for building improvements, involving an estimated outlay of $1,590,045, these totals comparing with 939 permits issued in May last year for building improvements, estimated to cost $1,004,312.

Of the total for last month 241 permits were for frame dwellings, estimated to cost $553,850, and 565 permits were for frame business structures, to cost $90,245. There were two permits issued for reinforced concrete buildings, costing $516,000, and seven permits were for brick buildings, involving an estimated outlay of $171,000.

Taking the figures for the first five months of the current year they show a remarkable increase, more particularly in the valuation of the improvements projected, as compared with the corresponding period last year, the totals being, respectively, $9,448,230 and $4,105,007. In the matter of the permits issued, the contrast is less striking, the total for the first five months of this year being 6542, and for the corresponding period last year 5008.

At a recent meeting the City Council repealed the limitations of the Building Ordinance, forbidding building nearer to a building line than 3 ft., and structures may now be built right up to the line. Formerly in order to build to the line it was necessary that the structures be noninflammable, but by the action of the Council it would appear that all restrictions had been waived.

San Francisco, Cal.

The building situation continues quiet, with no immediate prospect of any considerable improvement, writes our correspondent under date of June 4. There is, however, a tendency for the smaller sort of work to increase, and it is likely that frame construction during the next few months may show an improvement.

Labor, lumber and other factors in the building of frame residences and small business buildings are lower than for a long time. Pine lumber is being quoted wholesale this week as low as $11, and wholesalers admit that it is being sold down to $10. Contractors are out soliciting smaller jobs and recently large holders of land in the outlying sections have begun building residences for installment purchasers. These things are contributing to a revival in frame building which, though small in comparison with the drop in larger work, is affording some relief to the situation.

The building permits for May reached a total valuation of $2,680,545, as compared with $2,827,054 for the month preceding and $2,709,731 for the month of May last year. The contracts of record were considerably below the figure for the permits, there being few large contracts and many of the smaller ones not being recorded. During the last week the value of the recorded contracts reached nearly $500,000, being rather above the average for the last few weeks. According to some architects there are a number of buildings of moderate size, ranging in cost from $100,000 down, in various stages of planning, on which bids will be called for before long.

Plans have been finally accepted and the preliminary work begun on the proposed new building for the San Francisco Savings Union, at the junction of Market and O'Farrell streets and Grant avenue, San Francisco. The building will occupy a rectangular lot, 76 x 91 ft., and will have three frontages. It will be a one-story building, surmounted by a large dome, the entire exterior, including the dome, being either of white limestone or of light colored granite. The main door and window grilles will be of antique finished bronze. The main entrance, on Grant avenue, will have steps on either side leading to the basement, where safe deposit boxes and storage vaults will be installed.

Wood Production in Germany.

Among all the nations of the world Germany receives the credit of being the most thoroughly scientific. She does with her limited natural resources what younger nations will soon be compelled to do in self-protection; she conserves them.

When our wood supplies, stored up from 100 to 500 years, are within sight of their end, and sawmills that have been moved from the white pine belt of the North to the yellow pint belt of the South have been moved to the Pacific Coast for their last stand, then Germany's scientific forestry policy will receive better recognition.

We do not think of moving a gristmill about from one wheat field to another, as the fields in turn become exhausted. After one crop is harvested another is coming on. So it must be with the sawmill and the crop of trees. If it takes 50 years to raise a tree of a given species, then one-fiftieth of the forest may be cut each year, provided it reseeds or is replanted—and the sawmill stays at the same place and the workmen live in their permanent snug homes near by; the "lumber shanty" will be a thing of the past; raising trees a business like raising wheat.

Wages of Building Mechanics in Atlanta, Ga.

Some interesting figures have been compiled by the Builders' Exchange of Atlanta, Ga., which show the scale of wages paid at the present time in the various branches of the building industry in that city, as well as the rates paid a year ago. An examination of the figures shows that in eight lines of work there has been an increase and in five lines a decrease.

The following are the figures prepared by the Exchange:

	1908.	1909.
Bricklayers	45c.	45c.
Masons	45c.	45c.
Structural iron	44 4-9c.	40c.
Ornamental iron	44 4-9c.	$3.50 to $4.00
Plasterers	40c.	45c.
Lathers	29 7-9c.	27½c. to 30c.
Hoisting engineers	29 7-9c.	40c.
Tile setters	40c.	40c. to 50c.
Plumbers	40c.	44c.
Steam fitters	$3.50	$3.50
Steam fitters' helpers	$1.25 to $2.00	$1.25 to $2.00
Gas fitters	$3.00	$2.50 to $2.75
Carpenters	$2.50 to $3.50	$2.50 to $3.50
Stone cutters (soft)	50c.	50c.
Stone cutters (granite)	..	37½c. and 40c.
Marble cutters	50c.	50c.
Marble setters	50c.	50c.
Painters	$2.50 to $2.75	$2.50 to $3.00
Sheet metal workers	$3.00	$2.50 to $3.50
Electricians	$3.00	$3.00
Roofers	$1.75	$1.50 to $2.50
Cement finishers	45c.	45c. to 50c.
Laborers	$1.25	$1.15 to $1.25
Hod carriers	$1.25 to $1.50	$1.25

The following tables show wages in the various branches of the building trades in New York City and San Francisco as compiled by the Builders' Exchange, and furnish a means of interesting comparison:

	New York City.	San Francisco.
Masons and bricklayers	70c.	87½c.
Structural iron setters	56¼c.	62½c.
Ornamental iron setters	56¼c.	62½c.
Plasterers	68¾c.	87½c.
Lathers	56¼c.	62½c
Hoisting engineers	$5.50 per day.	75c.
Plumbers	62½c.	75c.
Tile setters	62½c.	75c.
Steam fitters	37½c.	75c.
Gas fitters	62½c.	75c.
Carpenters	62½c.	62½c.
Stone cutters	62½c.	62½c.
Marble cutters and setters	62½c.	62½c.
Painters	$3.50 per day.	56¼c.
Sheet metal workers	56¼c.	68¾c.
Electricians	56¼c.	62½c.
Cement finishers	62½c.	75c.
Laborers and hod carriers	$2.80 per day.	37¼-50c.

A close examination of the above figures shows the scale in New York City and San Francisco to be very much higher in many lines than it is in Atlanta.

Linoleum Wearing Surface for Concrete Floors.

In one of our recent issues a correspondent in South Africa made inquiry with regard to the use of linoleum upon concrete floors, and desired to learn of the best means of attaching it to the concrete surface. As being of possible interest in this connection, we present herewith some suggestions on the subject presented by S. W. Rushmore in *Cement and Engineering News*.

I have read in many papers descriptions of many fine concrete buildings, and in every case, in offices, the floors have been covered with hard wood, which introduces a large amount of combustible material in a building supposed to be fireproof.

I recently built a concrete extension to my factory, and, having no external fire risk and the goods manufactured being noncombustible, I decided to use as little wood as possible and carry no insurance.

The contractors recommended maple flooring for the office, and I found that that material was commonly used elsewhere; but I would not have it. I had observed that good quality linoleum would wear better than wood, so I had the office floors troweled off smooth and decided to cement the linoleum directly to the cement surface.

None of the linoleum concerns would take the contract, as they said "the moisture in the concrete will loosen the cement"; but I did not agree with them, so I had the linoleum fitted to the different rooms and did the cementing with my own force.

After carefully fitting the material to the edges of the room, the men would roll it back from one-half the space, carefully sweep the floor and scrape off any unevenness. Then the cement surface was covered to a depth of about 1-16 in. with liquid fish glue thinned down slightly with hot water, so that it would be worked with a large kalsomine brush. On many places the glue would be fully ⅛ in. deep, and we have observed that there is little danger of applying too much.

After coating the surface with glue the linoleum was carefully rolled back into place and for a few minutes a dozen laborers would walk back and forth over it to insure even contact. Then the operation would be repeated over the remaining half of the room. As soon as the covering was laid the entire surface was covered with brick, sections of structural steel and other pieces of flat, heavy material and allowed to remain for several days.

It was found that the glue would quickly harden at the seams and edges, but remained moist elsewhere for several months. Nevertheless, the atmospheric pressure was sufficient to prevent the slightest buckling at any point, even under constant use, and to-day, after over 12 months' hard service, we have an ideal floor surface.

The floor is almost as quiet as if covered with rubber, yet it has the feeling of wood and the firmness of cement. When wiped over occasionally with linseed oil and turpentine it remains perfectly waterproof.

The linoleum for the surface of about 4000 sq. ft. cost $400 cut to fit the rooms. We used just 50 gal. of liquid glue at a total cost of $85. The labor amounted to about $95, including the carrying of the large amount of brick for weighting the surface. Thus the total cost was but 14½ cents per square foot, probably less than half the cost of the average maple floor.

As our partitions are all of reinforced concrete 5 in. thick poured in place, and the only woodwork is about the door openings, we consider our offices practically fireproof. Even if it were possible for the linoleum to burn off from the cold concrete surface its calorific value is so small that it would not add appreciably to a fire.

A House of Many Materials.

A dwelling house which is in some respects unlike any other ever constructed in this country, if not in the world, is located in the city of Memphis, Tenn. It is a two-story structure with heavy projecting cornice and dormer windows, and has the lower story built of stone in blocks and chips collected by the owner in every State in the Union and in many foreign countries. In its walls are pieces of rare marble from Greece and Italy, sandstone from Norway, onyx from Mexico and odd specimens from Australia, Ceylon, Egypt and other distant lands.

These materials, which are set in cement reinforced with steel rods, include many examples of gold bearing quartz, ores of silver, copper and iron, together with curious bits of jasper, sardonyx and basalt.

It is stated that the walls contain more than 50,000 separate pieces, and the effect produced by the play of the rays of the sun upon them is both novel and brilliant.

COPPER ROOFING ON CONCRETE BASE.

BY W. B. NEUBECKER.

IN the following illustrations are shown the methods employed in laying the copper gutters and roofing on Substation No. 1 of the New York Central & Hudson River Railroad in New York City. In Figs. 1 and 2 are shown the section and elevation of the gutter and leader and in Fig. 3 the plan of the soffit. It will be seen that the entire framing is of iron, with the brackets of wrought iron.

In Fig. 1 A is a sectional view, in which the arch D is of enameled brick, as shown in the view of the soffit in Fig. 3 by D^1. Over this arch in A in Fig. 1 is concrete D E, given the required surface pitch to the outlets. On the concrete is the gutter lining, this locking into the angle iron B. The roofing connects to the gutter by means of the mold C.

In the elevation F shows the leader head placed under the outlet tube of the gutter at V, the leader head F being connected to the lower head J by means of the gooseneck H. The main leader head J is then connected to the leader L, which is held in position by the cast iron cated and also the method of securing the molding at the eave of the roof without nailing, but by the use of cleats. A is the brick wall, B the concrete gutter lining and C the concrete roof. E is the gutter lining, laid into the concrete gutter and locked into the angle iron at F and flashing up under the concrete roof at H. The

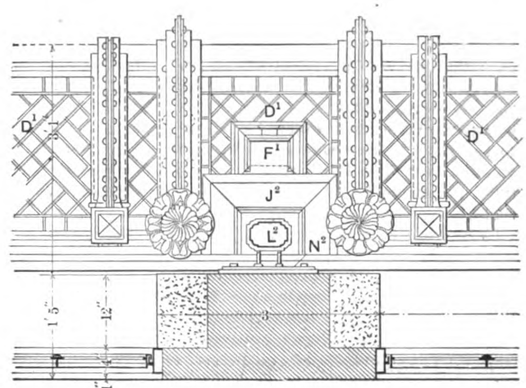


Fig. 3.—Plan of Soffit.

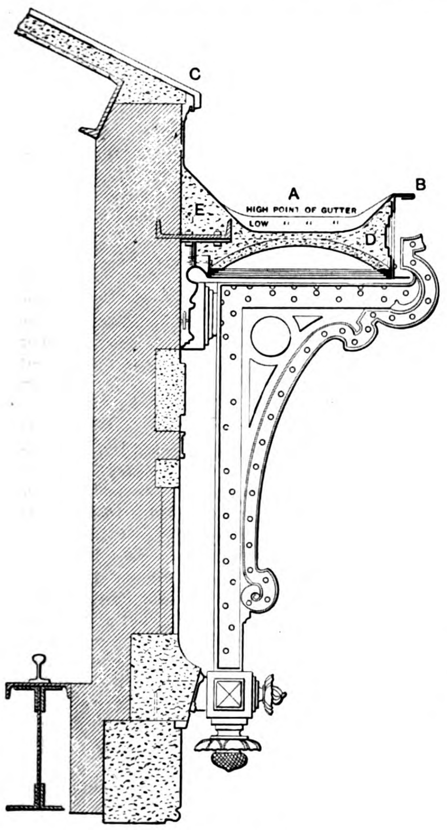


Fig. 1.—Section of Gutter and Leader.

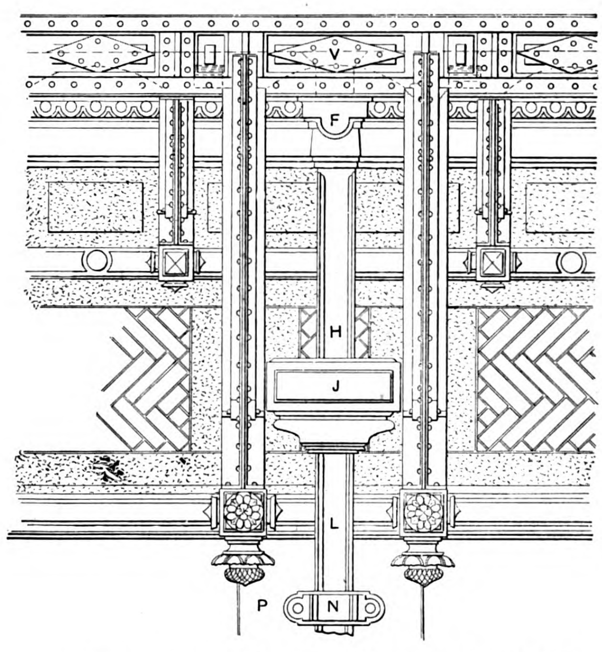


Fig. 2.—Partial Elevation of Front, Showing Leader and Gutter.

Copper Roofing on Concrete Base.

fasteners N, secured in turn to the stonework P by means of expansion bolts. The leader projects from the wall the distance indicated by N^1 on the plan, Fig. 3, while F^1 and J^1 represent respectively the soffits of the heads shown in Fig. 2 by F and J. The amount of the compound curve in the gooseneck H is indicated in Fig. 3 from F^1 to L^1.

The method used in laying the roofing and lining to overcome defects caused by expansion and contraction of the metal is shown in connection with Figs. 4 and 5. In Fig. 4 the construction of the gutter lining is indiangle iron at the front edge at F is secured to the ironwork as shown in Fig. 1.

Before the copper lining E is laid the cleats D and N are riveted to the gutter as shown and the rivet heads soaked with solder to avoid leaks, care being taken to obtain the correct location of the cleats so that when the molding J is placed on the eave of the roof the hem edged flange O will rest into the hook formed on the cleat, which is then closed with the mallet as at N. Note the drips formed on the molding at X and X. The upper flange of the molding J has a lock attached which is cleated to the roof L at M. Thus it will be seen that the entire lining and eave mold have no nails driven into the metal, thus allowing it to expand and contract freely. The cross seams in the gutter are first tinned, then edged, cleated and locked, thoroughly soaking the seam with solder, using rosin as a flux.

The roofing was constructed as indicated in Fig. 5, in which A B is the concrete roof. Wooden strips shown by C, D and E are nailed at given distances. Knowing this distance and the hight of the strip the copper sheets are bent on the brake in long lengths, tinning and edging the ends of the sheets, so that the cross seams can be locked. Assuming that this has been done, the sheets are laid in position as indicated by F, H, J and K. The first operation is shown at L. The cap M is then slipped on and the locks are then closed and turned down in the position shown by N. In this way the sheets have room for expansion and contraction, the entire roof being free from nails excepting where the cleat is nailed to the roof at the cross seams in F, H, J and K in the manner indicated in M of Fig. 4. At the ridge of the roof the sheets are double locked, as in standing seam roofing.

The work in question was furnished by the Estate of Jacog Bolz of 726 Eleventh avenue, New York, under the supervision of the New York Central architects.

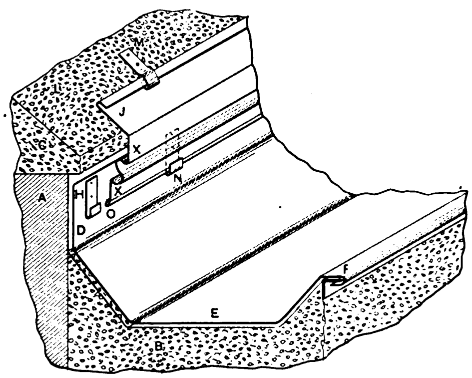


Fig. 4.—Construction of Copper Gutter.

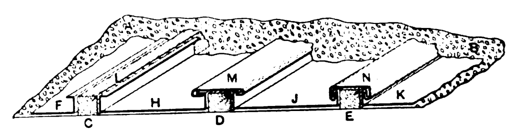


Fig. 5.—Construction of Copper Roofing.

Copper Roofing on Concrete Base.

The Fire Resistive Qualities of Building Materials.

The United States Geological Survey is about to issue through its Technologic Branch a bulletin describing the fire resisting qualities of building materials. In order to secure the data various materials used in building were subjected to the direct application of heat for two hours in the laboratories of the National Board of Fire Underwriters in Chicago, the temperature reaching that of a conflagration. After being exposed to the fire the materials were withdrawn from the furnace and quenched with water, in order to obtain the conditions that would result after the firemen had begun their work.

The investigations, which were conducted under the directions of Richard L. Humphrey, engineer in charge of the structural materials laboratory of the Survey, are the first of a comprehensive series undertaken with the object of determining the fire resistive properties and rates of heat conductivity of various building materials and the comparative efficiency of the various methods of fireproofing.

In his bulletin, Mr. Humphrey gives the following caution: "Inasmuch as the tests herein recorded present many features of considerable importance, it has been deemed highly desirable to publish a detailed account of them, although the results are preliminary and inconclusive and are presented solely for the purpose of making public the information required. They should not, therefore, be used as a basis for making conclusions. but merely as preliminary data regarding the relative fire resistive qualities of the building materials tested.

The conditions under which these tests were made were unusually severe, and none of the materials passed perfectly. The temperatures used would hardly be reached in an ordinary fire. Much of the damage done to the building materials in this series of tests was occasioned by internal stresses, the gas flame of the furnace heating one face of the test pieces much more rapidly than the other. All the materials tested, including the hydraulic pressed brick, cracked more or less. The concrete cracked least, but the tests indicated the necessity for using metal reinforcement in concrete walls to distribute the effect of the expansion.

It is apparent that the strength of the webs of ordinary hollow blocks is insufficient to resist the stresses set up in these tests, as in many tests the rapid rise in temperature and the subsequent quenching of one of the faces of the blocks caused the webs to split. It was noticeable that the richer the mortars used in these blocks the better they withstood the tests. The amount of water used in mixing the mortars had a similar effect on the fire resistive qualities, the mortars mixed with the greatest percentage of water giving the best results.

When the blocks were cracked or spalled before the application of water the damage appeared to be greater in the dry mixtures containing the greatest percentage of sand, and it was further observed during the fire test that the richer mixtures warmed up more slowly than the others. It is apparent that one of the causes of weakness in the cement hollow building blocks under these fire tests was the weakness of the concrete. a too dry and lean mixture, which coupled with the thinness of the webs provided insufficient strength to resist the stress due to the rapid expansion of the face. It is quite possible, as was shown in some of the block tests, to make blocks which will pass the conditions perfectly, but the web must be thick enough to give the necessary strength.

The brick panels probably withstood the tests better than the other materials. The common brick tested comprised unused new Chicago brick and used St. Louis brick. Fifty per cent. of the new bricks were split, while 60 to 70 per cent. of the old bricks were not damaged. Lime knots seemed to be responsible for most of the damage to the new bricks, as they were found at the bottom of nearly all the cracks. The bricks at the back of the panels were entirely unaffected. While the strength tests are not conclusive, there is apparently little difference in the strength of the bricks before and after firing.

The hydraulic pressed brick withstood the test very well. No damage was apparent after the firing and before the water was applied, and, although a number of the bricks cracked, 70 per cent. of them were found to be sound after quenching.

The sand-lime brick did not withstand the test as well as expected, but the sample tested. which was purchased at random, appeared to be somewhat below average quality.

The concrete behaved remarkably well. and it was difficult to determine whether the limestone. granite, gravel or cinder concrete sustained the least damage. The faces of all the panels were more or less pitted by the fire and washed away by the stream of water. The test was unfair to the cinder concrete. as the cinder was very poor, containing a large percentage of unburned coal. The sample selected, however. was the best of six or eight investigated in St. Louis. The limestone aggregate in the face calcined and the granite aggregate split and broke away from the surface mortar.

The granite concrete probably behaved better than any of the above mentioned concretes. Damage in no case extended deeply, probably not more than 1½ in. The high stresses produced in the panels by the rapid rise in the temperatures of the faces, while the backs remained cool, caused cracks. On taking down the panels the blocks of concrete were found to be cracked vertically for some distance from the face. The serious damage done the various natural building stones precludes any comparison among them. The tile tested was bought in the open market and in one panel was taken from a lot of material about to be erected in a building. A large percentage of the faces of the tiles was washed away by the water and the material composing the faces became soft and could easily be crumbled in the fingers. There was a comparatively rapid rise in the temperature of the backs of the panels. The plaster on the partition panel tile fell off a few minutes after the test was started."

New Publications.

Sanitation, Water Supply and Sewage Disposal of Country Houses. By William Paul Gerhard, C.E. Size, 5½ x 7¾ in.; 334 pages. Profusely illustrated. Bound in board covers. Published by D. Van Nostrand Company. Price, $2, postpaid.

The subject of this work is one of vital interest to the public at large, and in particular to those having to do with the essentials of sanitation in dwellings. It is important to all having the opportunity of planning and building for themselves a home in the country, that they bear in mind the importance of possessing not only an attractive and comfortably arranged house, but, above all else, a dwelling which shall be healthful, for upon the healthfulness of the home chiefly depends the comfort, well being and happiness of its inmates. In the first portion of the book the author treats of the general sanitation of country houses; compares life in the city with that in the country from the standpoint of health; dwells on the advantages of country life and gives a condensed summary of the essential requirements of healthfulness in country houses. He discusses in a most interesting vein the soil, sub-soil, surface drainage, healthful surroundings as well as those which are objectionable. The cellar of the house, the lighting, heating and ventilation, as well as the water supply, sewerage and plumbing.

In the second section of the work the author tells how to procure a satisfactory water supply. He dwells upon the sources of water, the various modes of raising it, the storage in reservoirs, elevated tanks or underground pressure tanks, and finally the means of distributing it to the several points where it is required. The matter is illustrated by actual examples from the author's engineering practice, together with a few examples of water supply and sewage disposal plans from the practice of other engineers and engineering contractors, the source being given in all cases.

The third and final portion of the book discusses the all important question of sewage disposal for houses which by reason of their location cannot be connected with sewers. Especial attention is given to some of the latest developments in disposal methods, such as septic tanks, cultivation tanks, contact filter beds and sprinkling or trickling filters. Throughout the entire work the aim of the author has been to tell the readers what to do rather than how to do it; in other words, he has endeavored to establish leading sanitary principles, which in turn should lead to correct sanitary practice.

The Building Foreman's Pocket Book and Ready Reference. By H. G. Richey, Superintendent of Construction United States Public Buildings; 1118 pages; 4½ x 7 in. in size. Illustrated with 656 figures. Bound in morocco, with gilt side and back titles. Published by John Wiley & Sons. Price, postpaid, $5.

As indicated by its title this work is intended to be a ready reference volume for the building foreman or those in charge of the various trades in building operations. As it is well known that a building foreman must possess a knowledge of all the various trades involved in the work under his charge, the author has brought together into one volume such information and knowledge of the different trades as he considers necessary for a foreman to know or have convenient for reference. In addition to the matter in question the author has included a large amount of other information, such as the care of plans, laying out and running work, organization of working forces, &c., all of which will be found particularly valuable to any one in charge of work.

The data within the covers of this volume are comprised in 14 parts or chapters, the scope of which may be indicated from their respective titles. In Part I the duties of the foreman are set forth in comprehensive style, while in Part II excavating and stonework are considered; in Part III brick and terra cotta work; in Part IV limes and cements; Parts V and VI mortar and concrete work; Part VII carpentry and woodwork, and Part VIII heating and plumbing. In Part IX miscellaneous trades are considered, such as marble and mosaic work, tile and slate work, lathing, plastering, painting, tin roofing, electric work, iron and steel work. &c. Part X deals with drawing and laying out work; Parts XI and XII with the strength of materials, as well as the weight, size, &c., of various materials. Part XIII presents mensuration and time saving tables, while Part XIV is devoted to useful information, recipes, &c. The entire work is arranged with a great deal of care and attention, and among the concluding pages are comments on the cost of work, with blanks to be filled out for materials, hours of labor, &c. A comprehensive index alphabetically arranged and occupying nearly 60 pages completes the work.

Metal Ceilings in South Africa.

Plastered ceilings are not common in South Africa, as in the United States, and to lath and plaster the inside of a building is unknown in this country. It was usual, until the introduction of metal ceilings, to use matched ceiling boards or leave the overhead beams exposed with only a coating of stain and varnish or paint to decorate them. The extent to which metal ceilings can be considered a boon to South Africa will be best understood when it is remembered that all timber suitable for ceiling boards must be imported from countries oversea, as South Africa produces none which can be used for that purpose.

It is estimated by those in the trade that for the past five years the average annual importations by Cape Town merchants amounted to 4800 squares of 100 sq. ft., or 480,000 sq. ft. It is also estimated that 500 squares, or 50,000 sq. ft., are consumed in the Transvaal per month. Metal ceilings are becoming more and more used in South Africa and are being put up in mercantile buildings, offices, schools, churches and many private houses. As they come into competition chiefly with ceiling boards, the aim of the firms handling them is to sell as near as possible to the price of ceiling boards. The advantages of metal ceilings over ceiling boards is now generally recognized, and where expense is not too closely considered the metal is being used exclusively.

Ceiling boards sell here at $3.04 to $3.65 per square of 100 sq. ft., and the landed cost of metal ceilings is $3.41 to $4.87 per square. The present customs tariff admits ceiling boards of British origin into the South African customs union free, and those from foreign countries at 3 per cent. ad valorem, while metal ceilings of British origin are charged 12 per cent. and foreign 15 per cent. ad valorem. This gives the ceiling boards a very considerable advantage, but it is thought that when the customs tariff is revised, the two will be placed on an equal footing, as both have to be imported and both are used in the erection of houses, to reduce the cost of which is believed by every one to be essential.

Metal ceilings have been imported from both Canada and the United States. Consul-General Julius G. Lay, Cape Town, is informed that Canada gets more than double the amount of the trade enjoyed by the United States. Canadian manufacturers have been willing to give easier terms to their customers here than those offered by the American manufacturers, and have shipped on consignment to enable their customers to have stocks on hand and be able to deliver at shortest notice, and thereby secure many small orders which could not be obtained if immediate delivery could not be given. Although the Canadian manufacturers have secured a large share of the trade in South Africa, and sell at a slightly lower price, it is stated that the best metal ceilings come from the United States, and their superiority is everywhere recognized.

American manufacturers of metal ceilings will find South Africa a growing market for this line, and if they can compete with Canadian prices they will, by offering easy terms to importers of satisfactory financial standing, very much increase their sales here. A plant for stamping and finishing metal ceilings from sheets imported from England was lately imported into the Transvaal fróm the United States, but its output is said not to be meeting with favor.

Painting Over Cement.

This is painting season to the average property owner, and it seems a most opportune time to put in a word with respect to painting cement. According to those who know, it is not safe to paint over the surface of cement until it has stood exposed to the weather for a year or so, unless the surface has first been sized with acid water to kill the alkali, and even then there is said to be some danger of bad results. A writer in a recent issue of *The Master Painter* points out a method, however, which has the sanction of many good painters. It is as follows:

Slack ½ bushel of fresh stone lime in a barrel and add in all 25 gal. of water; when slacked and cold, add 6 gal. of the best cider vinegar and 5 lb. of the best dry Venetian red. Mix well and then strain through a fine wire strainer. Use it when about the consistency of thin cream. Give the cement surface a coat of this and after standing a day or so apply a coat of red lead and linseed oil paint. After this has dried you may paint the surface any color you wish.

Some jobs require two coats of paint over the red lead paint. In this case make the second coat of paint serve as filler and paint both. This second coat may be made with plaster of paris and oil of the consistency of buttermilk. Then break up some white lead and oil to make a paint the same consistency as the plaster paint. Now take equal parts of each of the two mixtures and "box" them together, and thin to a working consistency with turpentine. This second coat should be applied as heavy as possible, or as heavy as you can spread it well. After this coat is dry apply your next and finishing coat of paint, which should be quite glossy, or about as you would for the last coat on woodwork outside.

The object in giving it this plaster paint is to prevent the running and wrinkling of the paint where considerable paint is to be applied to the surface. And it must be made to dry quickly.

America's Heavy Fire Loss.

At the forty-third annual meeting of the National Board of Fire Underwriters, recently held in New York City, President J. Montgomery Hare made an address, in which he stated that a comparison with statistics of losses in foreign countries shows that the loss per capita in the United States is from 10 to 30 times greater than in the principal European cities. For the last five years, he said, the annual fire loss in this country has averaged $269,200,412, the total for the period being $1,346,022,059, or about three-quarters of a million for each day of the five years. In this period the figures were largely increased by the San Francisco conflagration, but even taking the two years since then the losses have kept well above the $200,000,000 mark.

Without counting losses from forest fires, the destruction of property in 1907 by fire totaled $250,084,709, and in 1908, $217,885,850. The figures for this year give no promise of improvement, President Hare said, having reached a total of nearly $53,000,000 for the first three months.

Regulations for Wrecking Buildings.

In connection with the wrecking of buildings, a new regulation of the Superintendent of Buildings for the Borough of Manhattan, New York, requires that the wrecking contractor shall make a written agreement to erect a protective sidewalk shed in front of the premises upon which the wrecking work is to be done, which shed shall extend from the building line to the curb, and be properly, strongly and tightly constructed and capable of sheltering those using the sidewalk from any falling débris. The contractor furthermore is required to reduce to a minimum the scattering of dust and dirt, one special requirement being the proper wetting down of the brick and woodwork to lay the dust before removal.

THE new 20-story office and loft building which is in process of erection at the northeast corner of Fifth avenue and Thirty-first street, New York City, will cost in the neighborhood of $600,000 and covers a plot measuring practically 57 x 150 ft. The plans have been prepared by Architects Buchman & Fox, 11 East Fifty-ninth street, Manhattan, N. Y.

CONTENTS.

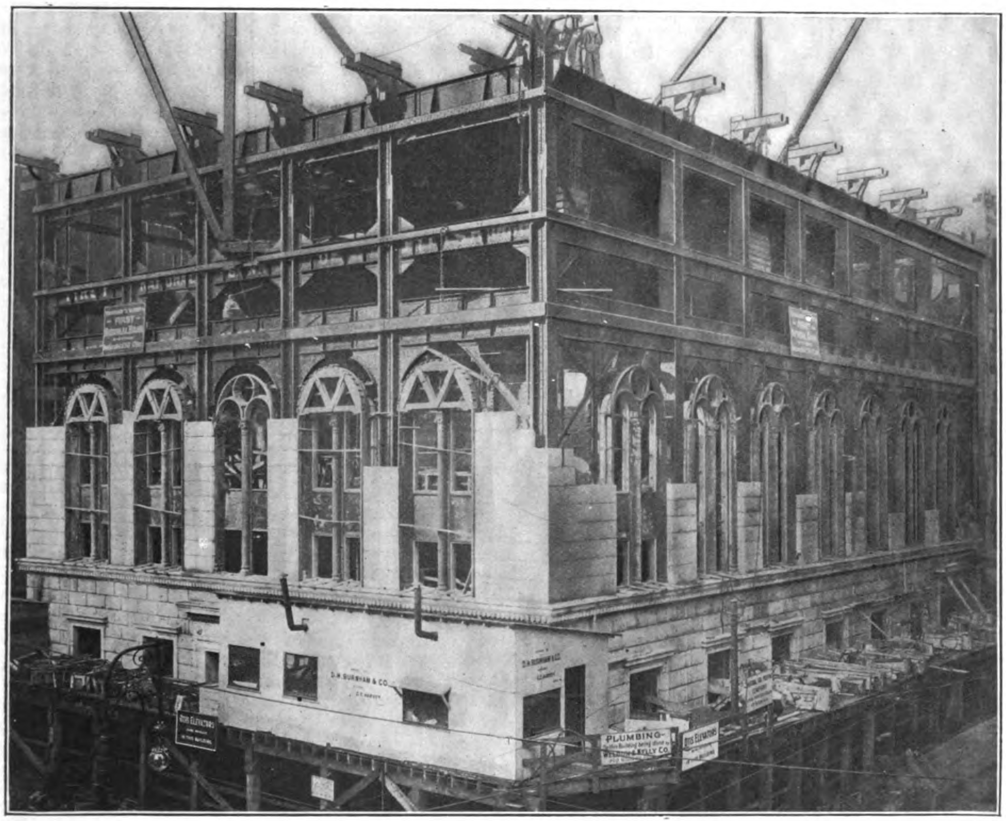
Carpentry and Building

NEW YORK, AUGUST, 1909.

Pittsburgh's New Bank Building

THERE is now rapidly approaching completion in the city of Pittsburgh a five-story building of impressive exterior, which will be devoted exclusively to banking purposes. It will be the new home of the First National Bank and is located at the corner of Fifth avenue and Wood street, a site which the bank occupied in part ever since its organization in 1852 as the Pittsburgh Trust & Savings Company, the old originally planned brick building having given place years ago to the structure which was razed last September to make space. On the basement floor, which is approached from the main stairway, are the steamship and foreign exchange departments and safety deposit vaults. A separate entrance to the foreign exchange department is at the far end of the Wood street front.

The illustration which we present is a direct reproduction from a photograph of the building, showing the steel framework, requiring a little over 1,500 tons of metal partially enclosed by the granite masonry. It also clearly shows the row of high arched windows above re-



View of First National Bank Building During Progress of Construction.

Pittsburgh's New Bank Building.—D. H. Burnham & Co., Architects, Chicago, Ill.

room for the present handsome edifice, now nearing completion.

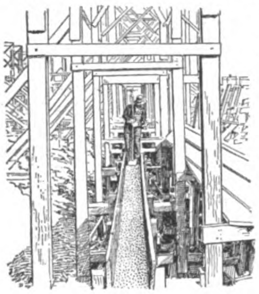
The design of the new building, according to architects D. H. Burnham & Co., Chicago, is of the pure Florentine type, the effect produced being one of great simplicity, combined with solidity, a combination peculiarly appropriate to a bank building. A particularly noticeable feature is the row of high arched windows, of which there are five on the Fifth avenue side and seven on the Wood street side.

The building has a frontage of 80 ft. in Fifth avenue and extends along Wood street for a distance of 120 ft. The main entrance is in the center of the Fifth avenue frontage through heavy bronze doors into a spacious vestibule, from which steps of gradual ascent lead to the main banking room. Mezzanine floors contain libraries, board and committee rooms and credit department, and on the top floor are the dining rooms and a recreation ferred to. The structure is now fully enclosed and the interior is being rapidly completed. It represents an investment of about $3,000,000, taking into consideration the site upon which it stands.

SIEVE-LIKE BUILDINGS in the State of Iowa are the subject of an interesting prognostication in the Des Moines *Register and Leader*. Attention is called to the fact that in the settlement of the State the demand for building material was so urgent that timber was freely used in unseasoned condition. The houses were at first fairly comfortable, but they are now in such condition that winter blasts penetrate them freely. Being mere shells, they are also susceptible to the heat of summer. The consequence is that many thousands of these houses all over the State are in a condition almost unfit for habitation, but too good to pull down. It is pointed out that as cement is now so cheap, and so many forms of metal lath are also to be secured cheaply, the exteriors of these houses are likely to be stuccoed, the movement in this direction having begun. This is expected to open up a continually increasing market for sheet metal and other forms of metal lath. What is said with regard to dwellings in Iowa applies equally well to other Western States.

COST OF REINFORCED CONCRETE BUILDINGS.

AMONG the interesting papers read before the recent meeting of the National Association of Cement Users was one on the above subject by Emile G. Perrot, Philadelphia, Pa., and from which we take the following extracts:



The use of plain concrete for footings, foundations and as a substitute for massive masonry wall construction has come to be generally accepted by the building world of to-day. Even the most skeptical as to its use for columns and beams do not hesitate to use concrete in the above manner. As the constitutional infirmities of plain concrete became more evident and its use consequently restricted, means for overcoming these weaknesses by reinforcing the material with iron or steel rods at once opened up the field of application of concrete, so that to-day entire structures from footing to top of cornice or parapet are constructed solely of this material.

Twenty-five years ago the idea of making buildings of the factory type fireproof was uncommon; almost any sort of structure was deemed fit to use for manufacturing purposes. As the ascendency of the United States in the manufacturing world became great and we commenced to lead in the manufacture of the world's products, architects and engineers at once saw a field for their labors that had heretofore been left to the caprice of untrained minds, it being the exception for an architect or engineer to be consulted in the designing of a strictly factory building. To-day, however, thanks to the persistence of the insurance companies on higher standards, the design of almost all manufacturing buildings is attended with much study, and they are usually built under the supervision of a competent architect or engineer. This change in methods has led to a much higher standard of building, and with the advent of reinforced concrete has come the commencement of a period when fireproof factory buildings are to be the rule instead of the exception.

We all know how the so-called "slow burning" type of mill construction supplanted the joist constructed building a few years back; how the building laws of large cities classify the buildings into first, second, third class, &c., according to their degree of fireproofness; how insurance companies are lowering the premiums on fireproof buildings; in fact, the tendency to-day is toward a better grade of buildings.

The Scarcity of Lumber.

We hear to-day a great deal concerning the scarcity of lumber; perhaps it is a good thing that lumber is becoming more expensive and the price almost prohibitive, for then we turn our thoughts to a substitute, and in doing so improve upon the methods that have been in vogue. The optimist's reply to the lumber question is, "Use reinforced concrete or concrete lumber; build so as not to burn, make your work permanent; reduce the cost of maintenance on your building, get lower insurance rates, or, better still, eliminate insurance." What is the need of insurance when the amount of inflammable material is reduced to a minimum? The cost of a building is very little more, and the interest on the additional investment is usually less than the insurance premium.

As to the increased cost of reinforced concrete over slow burning mill construction, everything else being equal, it varies from 10 to 30 per cent., according to the heaviness of the construction and the size of the building, also the number of times the forms can be reused.

Some buildings have been erected in which the floor loads were such as to preclude the use of heavy yellow pine timbers, as the sizes required would have been larger than it is practicable to obtain. On the other hand, the use of steel beam girders fireproofed would have added to the cost sufficiently to make the composite construction equal the cost of a pure reinforced concrete building.

In addition to the saving on insurance by having a fireproof reinforced concrete building, there must be taken into consideration the effect of wear and tear on the building if of the ordinary type; this is especially true where vibrating machinery is used, such as an instance of a leather factory, where the glazing machines are situated on the third floor. These machines were formerly in an upper story of a brick and joist constructed building, and produced so much vibration as to cause alarm to the owners, as well as making necessary constant attention to the shafting and machinery in the way of adjustment and consequently adding considerably to the running expense. In their new location the vibration is absent and the cost of upkeep on machinery and shafting is reduced so much as to amount to very little compared to the cost in the former building.

In comparing the cost of reinforced concrete construction with steel construction fireproofed, we find that concrete construction is cheaper than the steel construction fireproofed. Actual bids on the two types of construction for the same buildings obtained reveal some interesting facts.

Reinforced Concrete vs. Steel Construction.

For the Ketterlinus Building in Philadelphia, which is an eight-story and basement building, reinforced concrete was decidedly cheaper by about 20 per cent., and made a much stiffer building to resist the shocks of the heavy lithographic presses in the fifth and sixth stories of the building. This building has heavy concrete wall piers on the street fronts, veneered with 4 in. of mottled brick secured with copper ties. There are heavy reinforced concrete brackets connecting columns with girders and beams, and the floor system consists of deep girders and beams spaced about 4 ft. 6 in. center to center for beams, the slab being 4 in. thick. The column footings are reinforced concrete, but the interior columns for five stories are of structural steel fireproofed.

Another notable instance of the saving effected by the use of reinforced concrete is the Boyertown Building, Philadelphia. The owners saved about $60,000 by the skillful use of reinforced concrete for the entire construction, representing a saving of about 30 per cent. It is 10 stories and basement, built of a concrete cage having the front veneered with granite in the first story and brick and terra cotta in the upper stories. The side walls are adjacent to party lines, having simple reinforced concrete columns spaced about every 8 ft. 6 in. centers to carry the floors and roof. Those in the basement were set back from the party lines sufficiently far to build a continuous reinforced concrete footing within the property lines of the building, thus compelling the use of heavy reinforced concrete cantilever girders at the first floor level to carry the wall columns above; the load on the end of the cantilevers is 385,000 lb., and the leverage 29 in. The rear wall of the building is carried on cantilevers at each floor, due to a recess in the first story of the building for a shipping department. These cantilevers are 7 ft. long, but while they are much longer than those carrying the side walls, they carry less load, since there are cantilevers at each floor on the rear, while on the sides they exist only at the first floor level and carry nine floors and a roof. These are the heaviest concrete cantilevers ever built in Philadelphia, as far as I know. The reinforcement used throughout is cold twisted steel

CEMENT COATED BUNGALOW OF MRS. WILLIAM McINNES AT LAKE MICHIGAN PARK, MUSKEGON, MICH.

DESIGNED BY THE OWNER

rods, except the columns in the interior and some of the front wall columns, where structural steel cores are used.

A very marked saving was effected by the use of concrete over brick for the wall construction of the buildings of the Janesville Iron Works, erected at Hazelton, Pa. This plant consists of a machine shop, foundry, pattern and pattern storage buildings, power house and office buildings. All walls of these buildings are concrete and are monolithic. Concrete was decided upon for use in the walls because it effected a considerable saving over brick walls. As the site of the plant was such as to require considerable grading, and there were large quantities of rocks or mountain stones on the premises, the problem of bringing the ground to grade was most economically met by making the walls of the buildings of concrete. By this arrangement the contractor performed the grading without additional cost to the owner, using the stones in the concrete walls, making their removal unnecessary, and at the same time saving the cost of transportation of other materials for the walls.

To sum up, the cost of reinforced concrete buildings can best be considered by classifying them under several headings:

1. Warehouses and manufactories. Cost 8 to 11 cents per cubic foot.

2. Stores and loft buildings. Cost, 11 to 17 cents per cubic foot.

3. Miscellaneous, such as schools and hospitals. Cost, 15 to 20 cents per cubic foot.

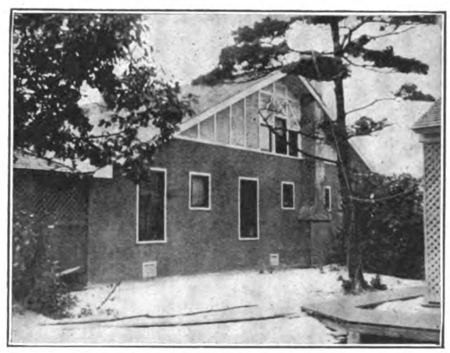
These costs include the building complete, omitting power, heat, light, elevators and decorations or furnishings.

CEMENT COVERED BUNGALOW AT MUSKEGON, MICH.

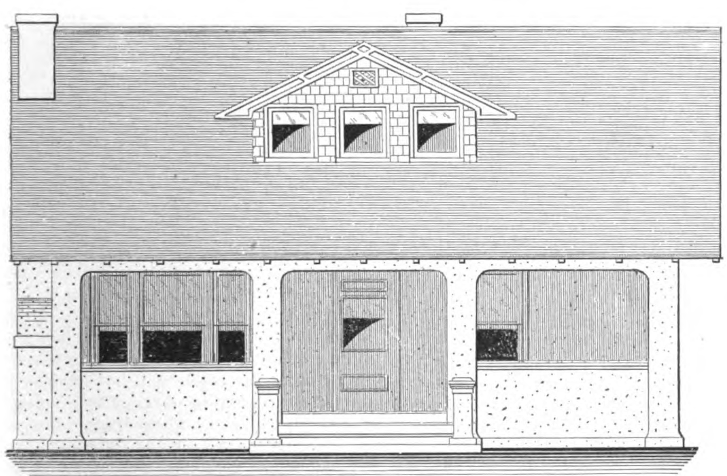
(With Supplemental Plate.)

THE subject of the present article is an inexpensive concrete bungalow designed for a summer home or camp at Lake Michigan Park, Muskegon, Mich. The half-tone illustration forming the basis of our supplemental plate gives an idea of the external appearance of the finished building, while the half-tone view upon the following page shows the interior of the living room looking toward the open fireplace. The plan shows the general arrangement of the several rooms on the main floor. In what may be termed the attic is a children's playroom and two small rooms which may be used for servants' quarters if necessary.

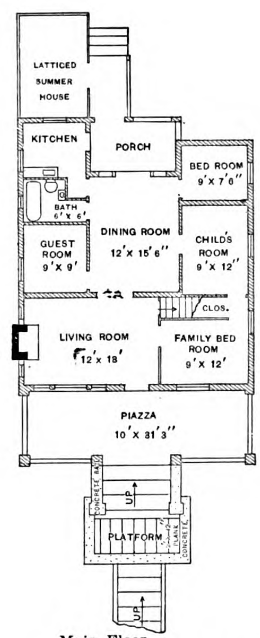
The foundations are of concrete, 4 parts Lake Michigan sand and 1 part Portland cement, which was first tested and found to make a stone of about the strength



View at Side and Rear.



Front Elevation.—Scale, 1/8 In. to the Foot.



Cement Covered Bungalow at Lake Michigan Park, Muskegon, Mich.

Main Floor.

of the best sandstone. As the supply of sand was unlimited, walls were placed under the centers as well as under the ends of the floor joists, thereby reducing the span of the joists to approximately 7 ft. On the main floor 2 x 6 in. joists were used spaced 24 in. on centers. The upper joists are 2 x 8 in., also placed 24 in. on centers. The lower partition is directly under the center of the upper floor, thus making everything perfectly rigid.

The entire inside of the house is ceiled on the main floor with Arkansas pine, finished in shellac varnish, but is left natural in the attic. The interior casings are

2 in. wide and beaded, being mitered at the corners, giving a neat and tidy appearance. The interior doors are of 1⅛ in. tongued and grooved cypress, with battens let in ½ in. and fastened with screws. The ceiling boards in all rooms are vertical on the walls and nailed to 1⅛ x 2 in. furring strips gained into the studding.

The exterior frame is covered with No. 1 pine lath wired at all outside angles and covered with cement, the work being done by day's labor. The first coat was made of 1 part well haired lime putty, 1 part Portland cement and 4 parts sharp sand, followed as soon as it was sufficiently set to work, with a second coat composed of 1 part Portland cement and 3 parts sharp sand, giving a thickness of a full inch of cement mortar. The first day's work the lath were wetted with a brush ahead of the plasterers, but not sufficiently to keep the lath cracks from showing up; afterward when the lath were thoroughly soaked there was no further trouble. The "throw" coat was applied with a short handled broom, and all thoroughly sprinkled for three days after being put on.

The cornice is simply an extension of the rafters sheeted in with ½-in. beaded ceiling under the 1 x 3 in. roof lath, the extension being framed ½ in. lower than the rafters proper. The flying rafters are 2 x 6 in. and are paneled with ⅜ x 1½ in. lattice strips.

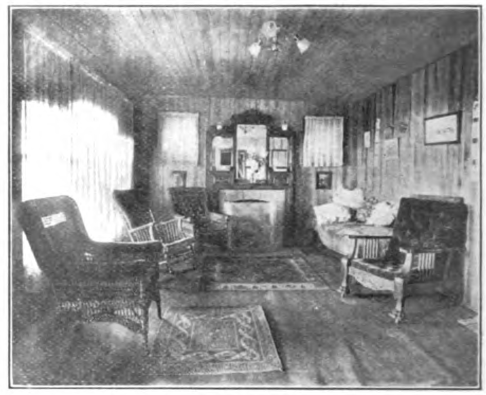
The designer points out that the ventilation is first-class, the location being considered. The three windows and door on the front porch, the open arch between living and dining rooms, and the large French windows at the back porch make the lower rooms practically like an extensive porch. Both the front and rear porches are screened.

The floors in the living room, dining room, bathroom and kitchen are covered with linoleum, while the bedroom floors are painted a slate color.

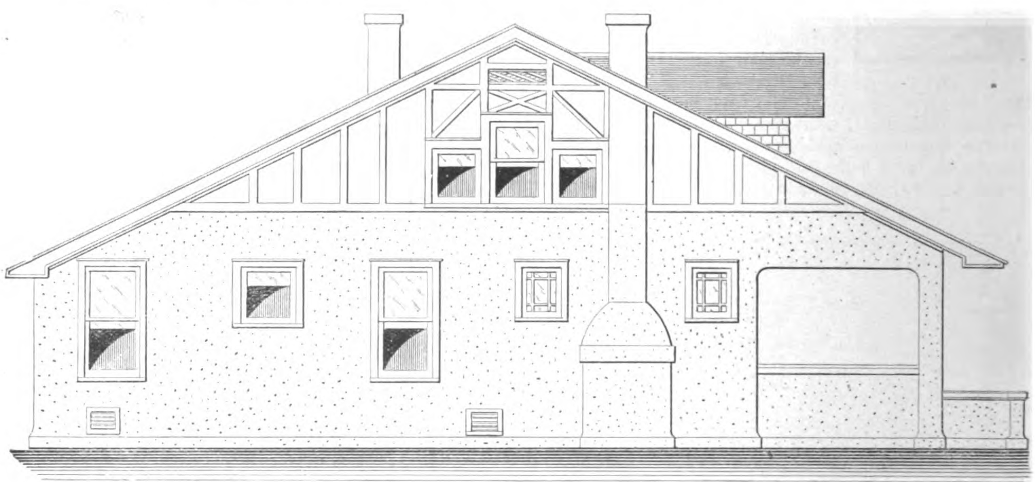
The open fireplace is quite a feature, being monolithic concrete lined with firebrick. The hearth of the fireplace has the word "Home" molded into the surface.

Batten doors were made for all openings on the main floor, so as to effectually close the house against marauders during the winter months.

The cottage here shown was designed by the owner, Mrs. William McInnes, 536 North Oak Park avenue, Oak Park, Ill., and was built practically without a change from the original design.



View in Living Room Looking Toward the Fireplace.



Cement Covered Bungalow at Lake Michigan Park, Muskegon, Mich.—Side (Left) Elevation.

Estimating in Rush Times.

In rush times there has always been a tendency on the part of the contractor to take rather more than a proper share of risk in estimating. Architects frequently receive offers over the telephone to submit bids within a few hours. The man who makes such an offer is risking his money at too fast a pace. The contractor should be particularly careful in the busy season to steer clear of unsystematic, hurried bidding, says a writer in a recent issue of the *Contract Record.* Of course, there is no stated proportion of time in estimating. A contractor may spend three or four days in figuring a small piece of work and then only require a few hours' time to estimate a large job, but he should not tell an architect over the telephone that he can estimate a job in 2 hr. until he has seen the plans.

In making up an estimate it is better to keep each factor of a complete estimate separate as much as possible, to finish it and double line it, and to make a summary at the end of all the different items or classes of work, so that in case any change in specifications is made in any one class of work the whole will not have to be added and corrected from page to page. The same system should be carried out with subheadings. For example, in brick work there may be many different items. If the whole is put down as so many cubic feet or thousand brick, there is no way of separating a change without going over the whole job again.

The specifications should be followed as nearly as possible, item by item, starting with excavating or whatever may come first. Each branch of work should be kept separate. Extensions should be carried out to the cents and the profit added at the last, in one item, unless the bid is made up on each branch of work separately, in which case it is advisable to add the profits to each branch.

A tender should always be itemized, as all excavating, brick work, cut stone, carpentry, plumbing, &c., thereby eliminating any hidden work that may not show on the plans or may not be mentioned in the specifications.

RUNNING ARCHES IN PLASTER OR CEMENT.

By WILLIAM GREGORY.

WE shall next take up for the consideration of the reader a few examples of arches which may be run in plaster, cement or artificial stone, and which are of such a nature as to be found instructive and useful to the plasterer and artificial stone worker. The illustrations which are presented herewith afford a good idea of the manner in which the work may be successfully executed. In Fig. 1 is shown the method of running a semi-circular arch, which, being half of a circle, is run from a single center. This arch is very often run with a sunken panel on the soffit, as shown at S, which may be divided into center of the soffit strikes the center pin. Now run the arch as before, after which the soffit is finished with a little white mortar gauged very high. The panels can then be spaced and the stiles planted in position, mitered and everything left clean.

The Gothic arch shown in Fig. 3 is run from two centers. Let B C represent the width of the opening, and with B as center describe the curve C D; then with C as center describe the curve B. D. Should the arch be lined in imitation of stone the joints will be drawn from these centers, as shown by the dotted lines.

In Fig. 4 we represent a semielliptical arch, which is described from three centers. This form of arch, while it can be run with a trammel, is often run with a template and pin mold, but it may be well here to describe one very common method of making the template, also the pin mold. Having procured a board of sufficient size,

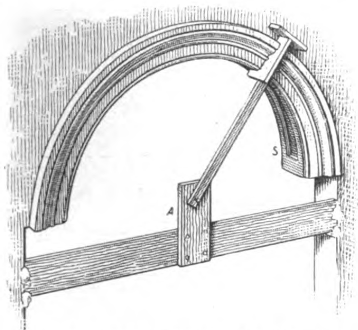


Fig. 1.—Method of Running a Semicircular Arch.

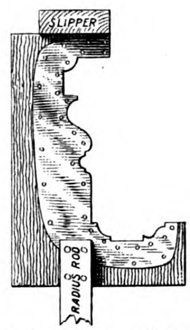


Fig. 2.—An Enlarged Profile of the Architrave Mold Shown in Fig. 1.

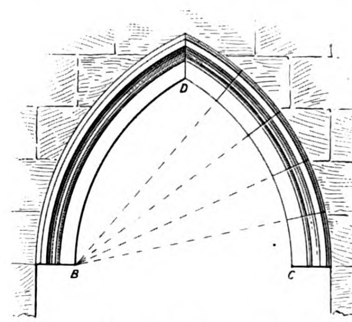


Fig. 3.—A Gothic Arch.

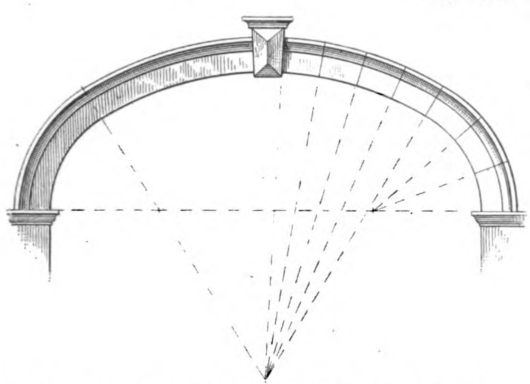


Fig. 4.—A Semi-Elliptical Arch Described from Three Centers.

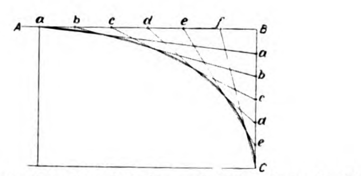


Fig 5.—Method of Laying Out Span of Arch Shown in Fig. 4.

Running Arches in Plaster or Cement.

several small panels by planting cross rails or stiles at equal distances apart.

An enlarged drawing of the architrave mold and outside rail of panel, which members are to be run in one operation, is presented in Fig. 2 of the illustrations.

In order to run this mold it is first necessary to fix the center board in a level position to opposite sides of the wall 6 in. below the spring line, fastening it with a little gauged plaster. The center board should have a short piece nailed on, as shown at A in Fig. 1, to receive the center pin. This arrangement will allow the mold to be run down somewhat below the springing line, and so permit of making a clean finish to fix the truss under without any mitering. Having finished one face of the arch, run level lines from the top of the center board through on each wall to the opposite face of the arch and fix the center board in position as before, taking care that the plumb line squared out and suspended from the usually made up of a number of pieces joined together, smooth them off, so as to present an even surface. The span of the arch may be laid out on this in the manner shown in Fig. 5. Referring to the diagram divide the line A B into any number of equal parts, as at *a*, *b*, *c*, *d*, &c.; also divide the line B C into the same number of equal parts and draw lines from *a* to *a*, from *b* to *b*, from *c* to *c*, &c. Repeat this operation on the other side, when a line drawn through the intersections as shown from A to C will give the desired curve.

In cutting out the template it should be extended and fixed on the spring board, as shown in Fig. 6, where the pin mold is also shown in position. This will allow the mold to be run down below the spring line and so save mitering.

In Fig. 7 is presented a view of the mold showing the position of the pins on the template, also how the slipper is horsed to the mold, which is quite different to the arrangement when the mold is run on a rod. The corbel mold is sometimes run to receive this arch when used for external purposes. Keystones are also added with good effect, which are cast in one or more pieces and planted in position. The joints will be drawn from the centers, as indicated by the dotted lines in Fig. 4.

What is known as a flat pointed arch and sometimes called Ellipse-Gothic is illustrated in Fig. 8. It is described from four centers, in the following manner: Taking L J as the width, divide this into four equal parts. Take the points 1 and 3 as centers and describe the segmental curves H L and K J. Draw lines through the points 1 and 3 at an angle of 45 degrees, cutting the soffit of the arch at H and K. Now take 1 and J as radii and, with L and J as centers, describe arcs cutting the lines just drawn at M and N. Now with M and N as centers complete the arch from H and K to O. This style of arch is often used for low, wide doorways, and with a bold impost mold and spandrels makes a fine finish, as indicated in the drawing.

An arch that is commonly used in very narrow hallways, and, while simple to produce, is nevertheless, very effective when complete, is indicated in Fig. 9 of the illustrations. To describe this arch first drop a plumb line from the point A, when the distance from B to C will be the radius. With this radius fixed to the mold, run a complete circle on the bench, as described in a previous article. Cut this into four quarters and plant two on each side of the wall, taking care that they are plumb on the face and level one with the other. Remove the radius rod from the mold and run a long straight piece on the bench. Cut the short pieces to miters and fix plumb both ways; then cut and fix the two top pieces level; finish the miters clean, after which the soffit will be finished plain. A piece of corbel molding run on the bench and cut to return miters and planted underneath, as at D, makes a suitable impost, and the whole gives a very neat, yet plain, finish to the hallway in connection with which the arch may be used.

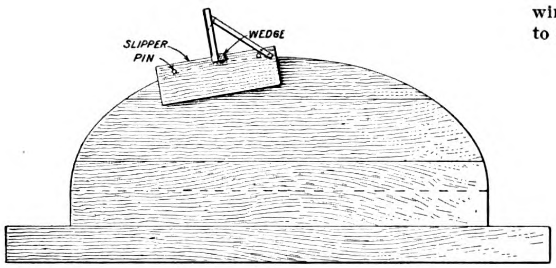


Fig. 6.—Template Fixed to Spring Board.

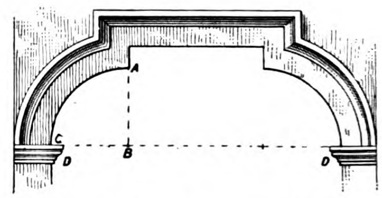


Fig. 9.—Arch Suitable for Narrow Hallways.

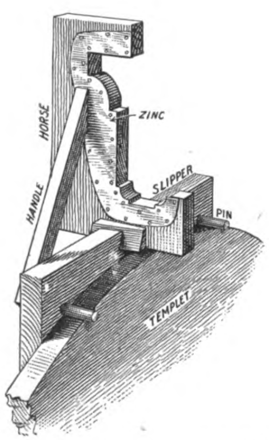


Fig. 7.—View of Mold Showing Position of Pins on Template and Slipper Horsed to the Mold.

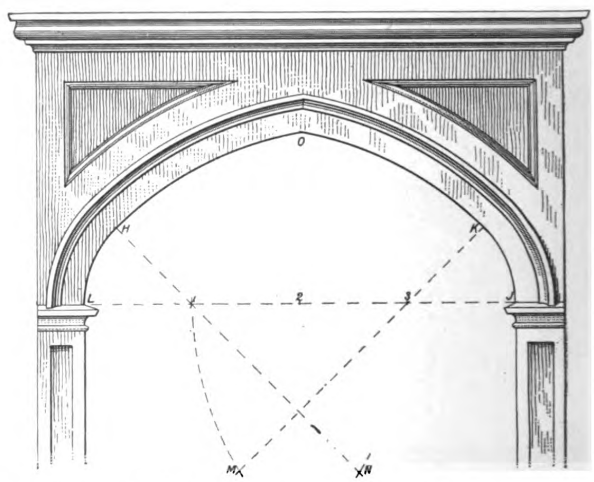


Fig. 8.—A Flat-Pointed Arch, Sometimes Called "Ellipse-Gothic."

Running Arches in Plaster or Cement.

The Flat, as Seen by a Humorist.

Flats are now cultivated extensively throughout the country. Some varieties are short and scrubby; others grow to an immense hight, says T. L. Mason, in *Success Magazine.*

Almost every flat has a spinal column running up and down its center. This is the elevator shaft, and consists of hot air.

When a flat is more costly than people can afford to live in it is called an apartment. A flat in its primitive state consists of a small bathroom, almost completely surroundered by total darkness.

A flat is a substitute for home, at one time a popular winter and summer resort, where traditions were allowed to grow up carelessly. Now in every well conducted flat the traditions are drawn out every morning through a tube by the pneumatic cleaning process.

Babies happen occasionally, even in the best regulated flats. Thus we see that nature, even under modern surveillance, sometimes nods.

Flats are constantly growing in size and importance. It is estimated that very soon they will hold all the people in the world, who will then come to depend entirely upon our fertile roof gardens for their means of sustenance.

Flats have an awful mean temperature of 2 degrees below zero in winter and 92 degrees above zero in summer.

When all the trees have been made into flats it is thought the millennium will have arrived. Every flat has the word "Welcome" over the kitchen door. Also many of them this motto:

"All ye who enter here leave soap behind."

SOME INTRICATE PROBLEMS IN FRAMING.—VI.

By C. J. McCarthy.

A WINDOW SASH in a circular wall with diamond or lozenge shaped panes is illustrated in Fig. 32 of the drawings. The diagram requires very little explanation except to say that A and B are sections of the stiles, E a section of the center bars where they meet the rails, and C and D the sites of the crossings or intersections of the other diagonal bars. The method adopted in laying out sashes of this kind is to prepare a drawing board of the same curvature as the sash and upon it full size lay out the sash so that the lengths and bevels of all the pieces may be taken from it.

semicircular head rail. The most satisfactory way of constructing this sash head is to form it of two pieces, each piece being a quarter circle, and as each of these quarter circles will have a compound curve it will be necessary to prepare molds from which to mark out the curves.

To do this draw the chord line J *b* of the half plan, producing it to U. Parallel to it draw the tangent T *c*; draw also the lines J T and U *c*. The rectangle J U T *c* then represents the thickness and width of the material required for each piece of the top rail. It will be seen upon inspection of the drawing that the stiles and bars of the sash are splayed according to the radial lines of the plan and that they fall level at the top, thus making the curves of the elevation slightly elliptical on the convex side.

Having drawn the section of the stile at A, continue the face line to join the lines J U and T *c* in P and R. Raise the dotted perpendiculars P Q and R V to the line E F and draw the curves Q O and V O. Divide the quad-

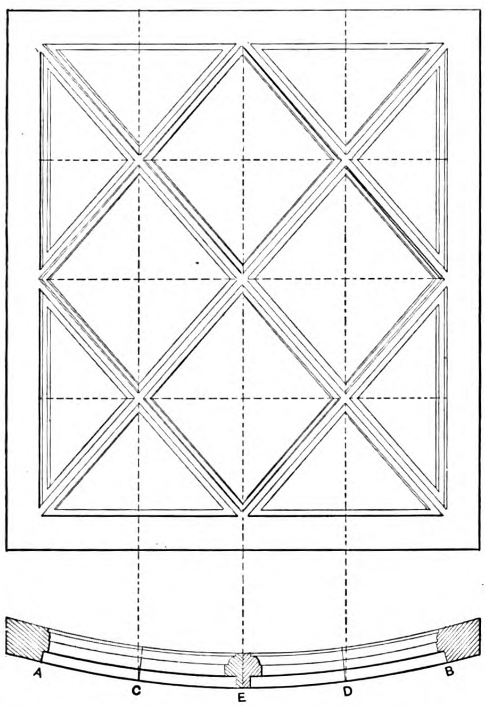


Fig. 32.—Sash on a Circular Plan with Diamond or Lozenge Shaped Panes.

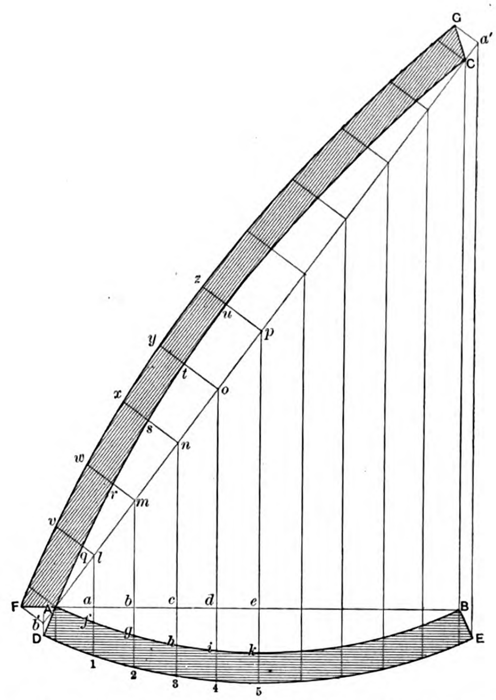


Fig. 33.—Method of Laying Out Face Mold for Diagonal Bar for Circular Sash.

Some Intricate Problems in Framing.—VI.

For the purpose of finding the mold for the curvature of the diagonal bar let A B E D of Fig. 33 represent the plan of the bottom rail, and let it be divided into any number of equal parts, as 1, 2, 3, 4, &c. Through these points draw ordinates at right angles to the chord line A B, meeting it in *a*, *b*, *c*, *d*, and produce beyond it to meet the chord line A C of the diagonal bar in *f*, *m*, *n*, *o*, *p*. Through these points of intersection draw ordinates perpendicular to A C and make them equal to the corresponding ordinates of A B, as *l q v* to *a f* 1 and *m r w* equal to *b g* 2 and *n s x* equal to *c h* 3, &c., which will give points in the curves of the mold.

Our next problem has to do with the construction of a sash the plan of which is the segment of a circle and the head rail a semicircle having a cote or chord bar and radial bars, as shown in Fig. 34, wherein A U B represents the plan of the sash and E G F the elevation of the

rant E G of the elevation into a number of equal parts, as 1, 2, 3, and from these points draw ordinates to the line T *c*, meeting it in 1', *i*', *f*'. From these points of intersection draw *l*' 1', *i*' 2' and *f*' 3' perpendicular to T *c*, producing them indefinitely. Prolong the center line G K to *c* and draw the line *c* G' perpendicular to T *c*. Make *c* O' G' equal to H O G and *f*' 3'' 3' equal to *f c*' 3. Make *i*' 2'' 2' equal to *i b*' 2 and *l*' 1'' 1' equal to *l a*' 1; then the curves S G' and R O' drawn through these points will be the mold for the convex side of the head rail.

Proceed in a similar manner to obtain the mold for the concave side. Draw the radial lines 1 7, 2 8 and 3 9, and through the points 7, 8 and 9 draw the ordinates 4 *l*'', 5 *i*'', &c., producing them until they meet the line J U in points *m*, *n*, *o*. From these points draw ordinates at right angles to J U. Draw the line *b* O'' G'' and make it equal to H O G. Make the other ordinates equal to the corresponding ones in the elevation, then the curves J G" and P O" drawn through the points thus found will be the mold required.

To apply the molds first true up the piece of plank to an even thickness and square the edge at U c. Mark off the distances U b, U J and c S on the inside and outside, respectively. Apply each mold to the side to which it belongs, keeping the ends fair with these lines.

Two other molds are now to be made by which to mark the convex face of the sash on the semicircular head rail after it is sawn out. These are to be applied to the convex and concave edges.

To prepare these patterns draw an indefinite line, as A B of Fig. 35. On it lay off the distances 1, 2, 3, B, equal to the divisions 1, 2, 3, G, of the convex side of the circular head in Fig. 34. From these points drop perpendiculars of indefinite length. Now make B d i of Fig. 35 equal to a b M of Fig. 34; made 3 c h of Fig. 35 equal to d e o' of Fig. 34; also make 2 b g of Fig. 35 equal to g h n' of Fig. 34; make 1 a f of Fig. 35 equal to j k m' of Fig. 34, and make A e of Fig. 35 equal to J y of Fig. 34. Through the points A, a, b, c, d and through e, f, g, h, i of Fig. 35 draw two curves, which will be the mold required to be bent around the convex side of the head rail to mark the convex face of the sash, which is marked by the side e i of the mold, the side A d being kept fair with the straight side of the timber to act as a guide.

The other pattern is required to trace the same curve on the concave side of the sash head and is shown in Fig. 36. The stretchout is laid out to the divisions of the curve X O of the elevation, Fig. 34, by the radial lines 1 7, 2 8, &c., and the points in the curves are found by setting off the ordinates in Fig. 36, equal to the corresponding ones in Fig. 34. The cote bar shown in Fig. 37 may be sawed out of a single piece of plank in the same manner as each half of the window head or it may be bent in one or more thicknesses of wood. The molds for the vertical curves of the cote bar are represented in Fig. 37 by the curves a K and b J for the concave side and H M and N L for the convex side. The method of obtaining the curves of these molds is the very same as that already explained in connection with the circular head rail, Fig. 34. Divide the curves B C and n O into equal parts, as 1", 2", 3" and 2, 4, 6. From these points draw ordinates to the lines H i and E I, respectively, producing them indefinitely. Then make the ordinates of H i and E I equal to the corresponding ordinates in the elevation for points in the curves.

It will be observed upon inspection of Fig. 37 that the sections of the cote bars at S and S on the plan are splayed and that it falls level at O and C in the elevation. This being so, the manner of laying out the molds for the horizontal curves is exactly the same as that already explained in Fig. 31. The only difference in the two figures is that the curve of the plans is opposite, but the mode of procedure in laying out the soffit is the same in both cases. The radial bars in this sash head have different curves according to their position. The one marked Z in Fig. 34 is straight, being in the center of the convex surface and parallel to the axis of the cylinder of which the curved plan forms a part; that marked & is an arc of a circle of the same radius as the plan; the one marked Y, however, being parallel to neither the axis nor the base, takes a diagonal direction around the surface of the cylinder, and, therefore, is curved to form a portion of an ellipse. To lay out the face mold from which this curve may be marked on the plank for the radial bars proceed as follows: Referring to Fig. 34, draw the center line H I of the radial bars; draw also the tangent M N parallel to J L; draw N y and q u perpendicular to M N. Divide N q into a number of

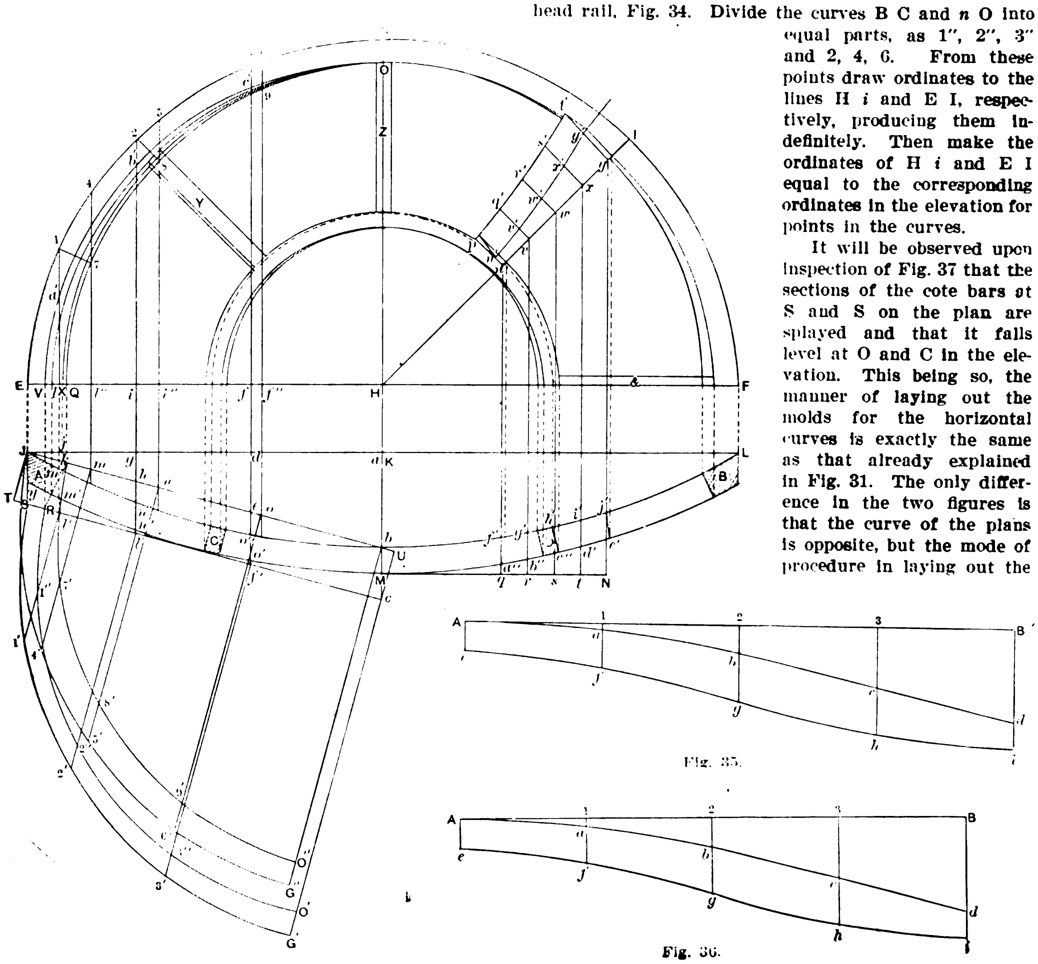


Fig. 35.

Fig. 36.

Fig. 34.—Sash for a Circular Wall with Cote Bars and Radial Bars with Circular Head Rail.

Fig. 35.—Development of Mold for Extrados or Upper Side of Head Rail.

Fig. 36.—Development of Mold for Intrados or Under Side of Head Rail.

Some Intricate Problems in Framing.—VI.

equal parts as represented by *r s t*. From these points raise the perpendiculars *r v*, *s w* and *t x*, and from the points *u, v, w, x, y* draw indefinitely perpendiculars to the line H I.

Now make *y y' t'* equal to N *e' j'* and *x x' s'* equal to *i' d' t* and so on, when the curves *p t'* and *u' y'* will be the face mold for the diagonal bar.

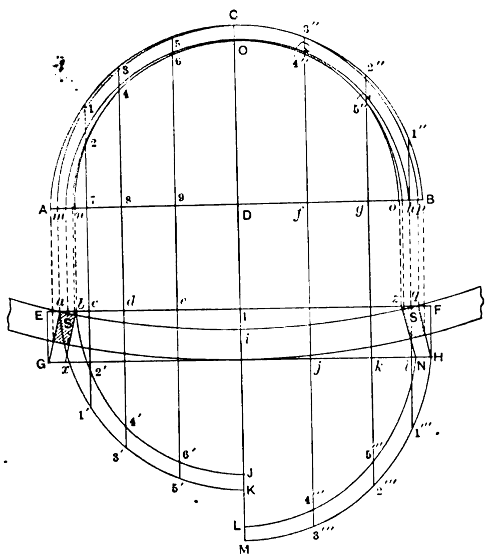


Fig. 37.—Development of Molds for Cote Bar.

Some Intricate Problems in Framing.—VI.

The Mill Man and the Architect.

We have in the recent past presented more or less in the way of criticism of architects by mill men, the comments being based largely upon the way millwork is often specified by architects in connection with buildings of all kinds. One of the latest contributions to the subject appeared in the May number of the *Woodworker*, and while dealing with a little different phase of the topic is yet of such general interest that we present it herewith:

There seems to be certain occasions when the planing mill man must be an architect himself, and other occasions when he must work from the architectural specifications of others. On practically all big jobs there are architectural specifications and blueprints, so all the mill man needs is some one who can take off details and follow plans. Occasionally more or less trouble starts from architects specifying things that are difficult to furnish, and being arbitrary about it. Sometimes this comes from lack of understanding on the architect's part of standard thicknesses and widths of stock, and things of that kind, and at such times, when the mill man explains these things, the better natured of the architects will make changes in conformity, so their plans can be filled without unnecessary expense. There is evidence in this for the necessity of a pretty close walk between planing mill men and architects—that relation, not only of friendship, but business connections, that would familiarize one with the other's affairs to such an extent that they can work harmoniously together with a minimum of errors or friction.

Now, to take up for a moment the matter of the planing mill acting as architect to many of the builders, we can see how the planing mill can at times favor architects and probably engender thereby a spirit of reciprocity that will lead architects into being less arbitrary about specifications and more inclined to humor the mill. Every planing mill now is occasionally called on to make plans and specify details for houses of modest type. There is more of this in the country than in the city, but even in the city there is quite a lot of it, and some planing mill men have to keep a sort of architectural or drafting department and a man competent to draw up plans and make blueprints. Sometimes a department of this kind helps the mill get business. A draftsman who can talk with prospective customers, get their ideas, and put them in concrete form in house plans, will frequently get an order for the mill to furnish the material and get out the mill work for the house on the strength of such plans.

If you follow this idea out far enough it leads eventually to the conclusion that it might be a good idea for enterprising planing mill men to develop quite an architectural department as an aid to business getting and to the conduct of their business. There seems to be a limit, however, beyond which it is frequently not wise to go, because it then puts one in conflict with architects proper, and naturally the architects resent planing mills usurping their part of the business. Also, frequently a man comes in contact with architectural concerns that issue house plan books and blueprints in duplicate at nominal prices. There seems to be a place somewhere along the line that it is wise for the mills to cut out the architectural business and call in a professional. In other words, while there may be a draftsman connected with the mill who can make out details, blueprints and design almost anything wanted, for that matter, yet when a man comes in with something pretentious in the way of a building this question arises: Is it best for the mill to go to the expense of making plans in detail, or will it fare better in the end to refer the customer to an architect?

Some men naturally feel disposed to capture all the work they can, and they work the architectural department to the limit, but others, who look at it in a different light, find it well to refer customers of a certain class to architects. The architects, in turn, appreciate this, and if they get a job on the plans submitted by them they are likely to give the mill referring the party to them a mighty good chance at the work, and to favor it with the specifications all they can. It depends somewhat on the location of the mill and its relation to architects, whether it is in the city where there are a number of local architects, or in the country where there are no architects. But almost everywhere the planing mill man is up against this architectural problem. And there is more than one way to look at it, and other problems besides the professional architect to deal with. There are, for instance, the architects who sell plans in duplicate and supply architectural books all through the country. These blueprints are frequently so altered that virtually the making of new plans is involved.

Taken altogether, this question of architectural work in connection with the planing mill is getting to be quite a complex problem that is growing in volume all the time.

Corrugated Iron Roofing in Australia.

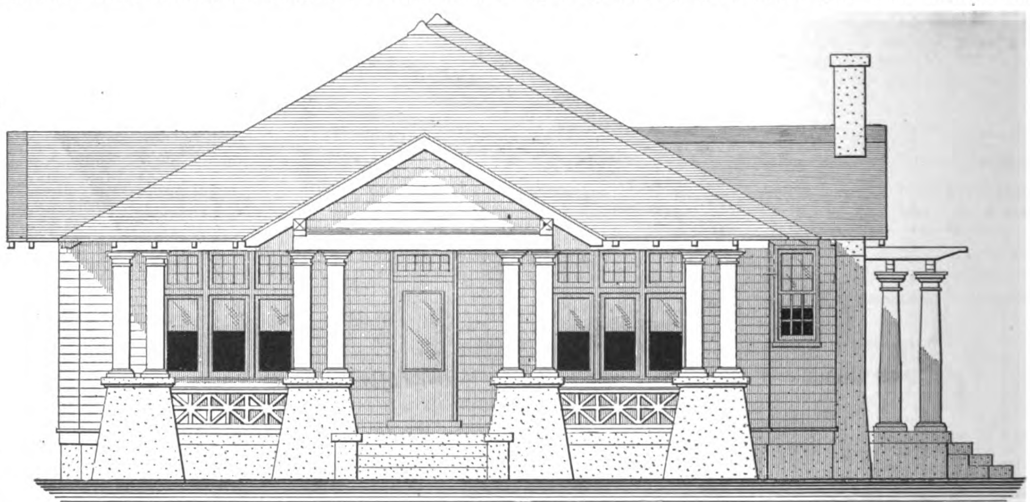
Some very interesting comments regarding the rather extensive use of corrugated galvanized iron roofing in Tasmania, Australia, are contained in a report to the State Department by Consul Henry D. Baker of Hobart based on his recent visits to country towns in the interior of the country named. Among other things he says:

The use of this roofing gives these small towns an appearance which seems distinctive and novel to one accustomed to the shingle roofs prevalent in the United States. The Tasmanian roof, however, serves a very important function in catching rain water for domestic use. In fact, except in the large cities, nearly the entire water supply is gathered on these corrugated iron roofs when it rains, and then runs into large cisterns, where it is stored. In rural architecture the roofs are made to cover as much space as possible, and there are usually many verandas covered with the corrugated iron for the purpose of gathering water. The stables and all subsidiary buildings are also covered with this roofing, and shops, churches, railroad sheds, &c., all have this roofing as a means of securing water to be stored in the cisterns. The cisterns are also of corrugated galvanized iron. This roofing is to some extent made in Sydney, but the greater part appears to be imported from England and Germany.

DESIGN FOR A SOUTHERN BUNGALOW.

AT the time of the announcement of the decision of the Committee of Award having charge of the drawings submitted in the recent Competition in Bungalows conducted under the auspices of this journal reference was made to several designs which, while not receiving prizes, were in the estimation of the committee of sufficient merit to entitle them to "honorable mention." It was also stated that it was the intention to publish some of these studies as soon as possible after the prize designs had appeared in our columns, and we take pleasure in presenting one of them herewith. It emanates from the South, and, it is fair to assume, is more or less typical of that section of the country. The elevations show the style of the exterior treatment, while the floor plan indicates the internal arrangement. It will be seen from the plan that there are six rooms with bath on the main floor, and that there are two main entrances, one being at the front from a porch extending practically across the width of the building, while the other is at the side through a pergola. From the side hall opens the dining room at the right and the living room at the left, while beyond the various other rooms are readily accessible.

There is a commodious reception hall at the front communicating with the living room through folding doors. Beyond the living room is the side hall, and out of this opens the dining room, with its built-in sideboard and communicating with the kitchen through a well equipped butler's pantry. The arrangement is such that by means of the central hall communication is readily established between the kitchen and the front door, while the bathroom is so placed as to be accessible without the necessity of passing through any other room. The living room is provided with an open fireplace and inglenook, with seats at the right and left. Each bedroom has a commodious closet, and the various rooms are all well lighted. The kitchen sink is placed directly under the triple windows of the kitchen, while the range is so situated as to have a window each side of it. The small circles in the various rooms, with the numbers close beside them on the plan, indicate the position of the lighting fixtures and the number of the lights at the points indicated. The cellar is excavated only under the rear portion of the bungalow, where a boiler and fuelroom is provided, together with storage space.



Front Elevation.—Scale, 1/8 In. to the Foot.

Design for a Southern Bungalow.—W. C. Lester, Architect, Memphis, Tenn.

According to the specifications of the architect, W. C. Lester, 639 Mashy street, Memphis, Tenn., the framing lumber is to be of No. 1 common yellow pine, framed as indicated in the details, and with trusses over all doors and windows. The floors and exterior wall studs are to be covered with 7/8 x 8 in. surfaced yellow pine sheathing put on diagonally. Over this is to be placed one layer of building paper, which in turn is to be covered with 7/8 x 10 in. resawed weatherboarding, laid with the resawed side exposed 8½ in. to the weather. The roof is to be covered with No. 1 cypress dimension shingles laid on 1 x 4 in. strips placed 8 in. on centers, the shingles being exposed 4½ in. to the weather, and every fifth course doubled. The shingles are to be dipped in creosote stain before being laid, and to be given a brush coat of stain as soon as the roof is finished. The weatherboarding is also to be given three brush coats of the same stain.

All interior finish is to be of yellow pine stained and filled and given three coats of Pratt & Lambert's No. 38 Preservative rubbed to a tile finish. The reception hall, living room, central hall and the dining room are to have 7/8 x 2½ in. edge grain yellow pine floors stained and given three coats Nisoron floor finishing varnish rubbed to an eggshell gloss.

The interior side walls and ceilings are to be plastered with Acme cement plaster and finished with a white coat of lime putty and plaster of Paris.

The plumbing is to include Standard Sanitary enameled fixtures, trapped and back vented and conforming to the city laws and rules. The electric wiring is to conform to the rules of the Southeastern Tariff Association, each outlet to be controlled by an independent switch.

The building is to have a Peck-Williamson hot air heating system, with galvanized iron piping and bronze finished floor registers to match the other hardware.

All exterior trim, such as the casings, columns, sash, &c., is to be yellow pine worked to details and given three coats Collier's lead and linseed oil paint.

The architect provides a very good estimate of cost in detail, which we present as furnished:

BILL FOR MILL WORK.

BASEMENT.

	Cost of material.	Labor.
2 single sash window frames, at $1	$2.00	
2 single sash for above, 1 lt., 12 x 20, at 90c..	1.80	
1 double frame, at $1.50	1.50	
2 single sash for above, 1 lt., 12 x 20, at 90c..	1.80	
1 3.0 x 6.6 door frame and trim	2.00	
1 3.0 x 6.6 x 1¾ door for above	2.25	
1 2.6 x 7.0 door frame and trim	1.75	

1 2.6 x 7.0 x 1¾ door for above............ 2.25
1 set stair treads, &c....................... 10.00
Carpentry work for above.................. $18.65

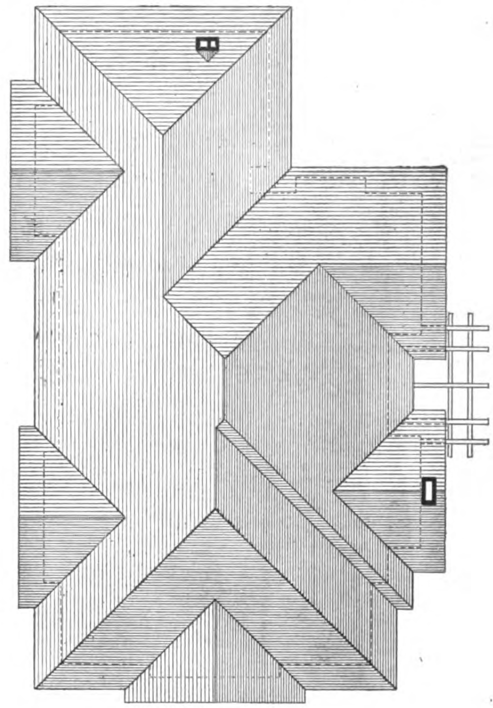
MAIN FLOOR.

3 triple window frames and trim, at $7.50.... 22.50
9 single jib sash, 1 lt., 20 x 44 in., P. P., 1¾ in. thick, at $4....................... 36.00
9 transom sash, 9 lts., 6 x 5 in., 1¾ thick, at $1.25 .... 11.25
2 window frames, 18 lts., 6 x 7 in., and trim, at $2 .... 4.00
2 pair C. R. sash for above, at $2.25......... 4.50
2 window frames, 16 lts., 16 x 10 in., and trim, at $2................................ 4.00
2 pair C. R. sash for above, at $2.25......... 4.50
1 quadruple frame and trim................. 10.00
4 single jib sash, 1 lt., 20 x 44 in., P. P., 1¾ in. thick, for above, at $4.............. 16.00
4 transom sash, 9 lts., 6 x 5 in., 1¾ in. thick, for above, at $1.25.................... 5.00
2 double single sash frames, 12 lts., 6 x 10 in., and trim, at $2...................... 4.00
4 single sash for same, at $1.50............ 6.00
1 window frame, 2 lts., 20 x 30 in., and trim, at $2.25.............................. 2.25
1 pair C. R. sash for same.................. 2.25
1 triple frame and trim..................... 6.00
3 pair C. R. sash, 20 x 30 in., upper sash 9 lts., at $2.25.............................. 6.75
2 frames, 2 lts., 24 x 30 in., and trim, at $2.25 4.50
2 pair C. R. sash for same, at $2.50.......... 5.00
1 single sash frame, 1 lt., 12 x 16 in., and trim 1.00
1 single sash for same...................... .75
1 single sash frame, 1 lt., 16 x 18 in., and trim 1.25
1 single sash for same...................... .90
2 double frames, 2 lts., 20 x 30 in., and trim, at $3.50 .... 7.00
4 pair C. R. sash for same, at $2.50.......... 10.00
1 frame, 2 lts., 20 x 18 in., and trim......... 1.75
1 pair C. R. sash for same.................. 2.25

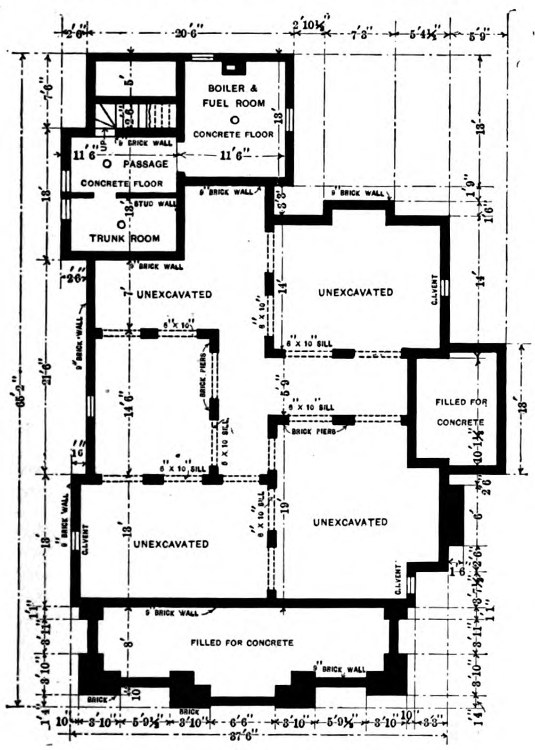
Carpentry work for above.................. 65.80

3 double sliding door frames, 6 x 8.6 ft. by 1¾ in., and trim, at $5.................... 15.00
3 pair sliding doors for same, at $8.......... 24.00
3 I. S. door frames, 2.8 x 7 ft. by 1¾ in., with transoms and trim, at $3................ 9.00

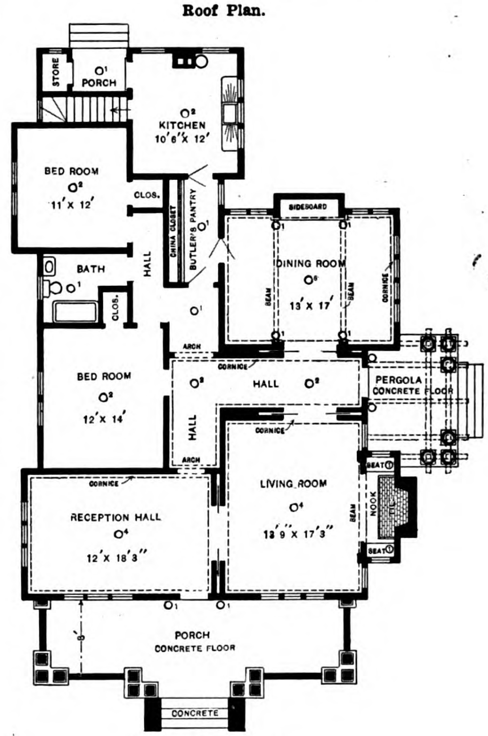
2 I. S. doors for same, at $2.50............. 5.00
1 I. S. door frame, 2.8 x 7 ft. by 1¾ in., and trim, at $2.50......................... 2.50
1 I. S. door for same...................... 2.50
2 I. S. door frames, 2.6 x 7 ft. by 1¾ in., and trim, at $2.25......................... 4.50



Roof Plan.



Foundation.



Main Floor.

Design for a Southern Bungalow.—Floor Plans.—Scale, 1-16 In. to the Foot.

3 doors for same, at $2.50.................. 7.50
3 transoms for same, at 75c................. 2.25
2 I. S. double acting frames and trim, 2.8 x 7 ft. by 1¾ in., at $3.25.................. 6.50

2 I. S. doors for same, at $2.25............. 4.50
2 I. S. door frames, 2 x 7 ft. by 1¾ in., and trim, at $2.10......................... 4.20
2 I. S. door frames for same, at $2........... 4.00

2 O. S. door frames and trim, 3 x 7 ft. by 1¾ in., with transoms, at $3.50	7.00	
2 O. S. doors with P. P. panels for same, at $10	10.00	
2 transoms for same, at $2.50	5.00	
1 O. S. door frame and trim, 2.8 x 7 ft. by 1¾ in.	2.00	
1 O. S. door for same	2.50	
1 O. S. door frame and trim, 2 x 7 ft. by 1¾ in.	2.25	
1 O. S. door for same	2.10	
Carpentry work for above		59.35
26 lin. ft. for dining room, at 40c	10.40	
Carpentry, putting same up, at 10c		2.60
60 lin. ft. cornice for D. R., at 20c	12.00	
Carpentry, putting same up, at 7c		4 20
1 sideboard to detail	40.00	
Carpentry, putting same up		12.00
2 pilasters and pedestals, at $5	10.00	
Carpentry, putting same up, at $1.50		3.00
50 lin. ft. wainscot and plate rail in D. R., at 60c.	30.00	
Carpentry, putting same up, at 15c		7.50
1 nook, seats, mantel, columns, &c., to detail	45.00	
Carpentry work		10.00
182 lin. ft. cornice in halls and L. R., at 15c	27.30	
Carpentry work, at 5c		9 00
1 china closet	20.00	
Carpentry work		12.00
200 ft. I. S. base, at 4c	8.00	
Carpentry work, at 2c		4.00
12 square porch columns, at $4	48.00	
2 ½-square porch columns, at $2.50	5.00	
6 round pergola columns, at $5	30.00	
30 lin. ft. balusters, rail and shoe, at 20c	6.00	
Carpentry on columns, balusters, &c		12.00
175 lin. ft. O. S. base, at 5c	8.75	
Carpentry on same, at 3c		5 25
350 lin. ft. picture mold, at 75c. per 100 ft	2.62	
Putting up picture mold at $1 per 100 ft		3.50
	$630.02	$228.85

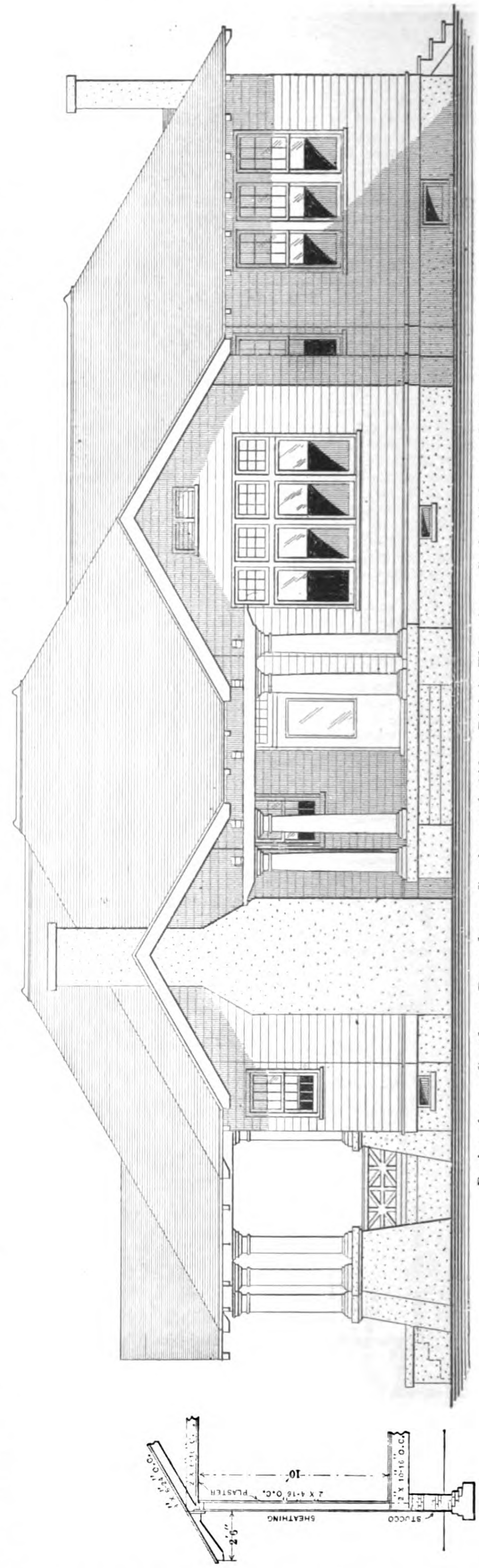
LUMBER BILL.

1,000 ft. ⅞ x 3½ in. edge grain flooring, at $35 per M	$35.00	
Carpentry, putting same down		$7.00
1,500 ft. ⅞ x 3½ in. No. 1 flooring, at $26	39.00	
Carpentry, putting same down, at $6		9.00
350 ft. ⅝-in. ceiling, at $22	7.70	
Carpentry, putting same down, at $8		2.80
750 ft. ⅞ x 3½ in. T., G. & V. jointed ceiling, at $26	21.00	
Carpentry, putting same down, at $10		7.50
2,500 ft. ⅞ x 10 in. reserved weatherboarding, at $28	70.00	
Carpentry, putting same down, at $10		25.00
23,000 shingles, at $3 50	80.50	
Carpentry, putting same on, at 90c		20.70
5,500 ft. ⅞-in. sheathing, at $16	88.00	
Carpentry, putting same on, at $6		33.00
12,000 ft. framing, at $18	216.00	
Carpentry work on same, at $8		96 00
850 yd. plastering, at 28c	238.00	
70 yd. excavation, at 20c	14.00	
15,000 brick, at $12 per M. laid up	180.00	
60 yd. stucco, at 60c	36.00	
600 ft. concrete floor, at 12c	72.00	
48 lin. ft. concrete steps, at 60c	28.80	
Painting and staining	175.00	
Plumbing	190.00	
Heating	175.00	
Electric wiring and fixtures	100.00	
Hardware and nails	65.00	
Tin valleys, &c	15.00	
	$2,476.02	$429.85
Carpentry	$429.85	
Total	$2,905.87	

The Need for Competent Mechanics.

The needs of the building and allied trades, as well as many others in the way of competent mechanics, is generally recognized, and the following pertinent comments taken from a recent issue of the *Painters' Magazine*, although dealing specifically with the subject from the standpoint of the painting trade, cannot fail to prove of more than ordinary interest at this time:

One of the most serious questions affecting the painting trade in the near future will be the supply of competent mechanics. The apprenticeship question has been one of the topics that has been constantly before the association since their organization, and it is no nearer a solution to-day than it was a quarter of a century ago.



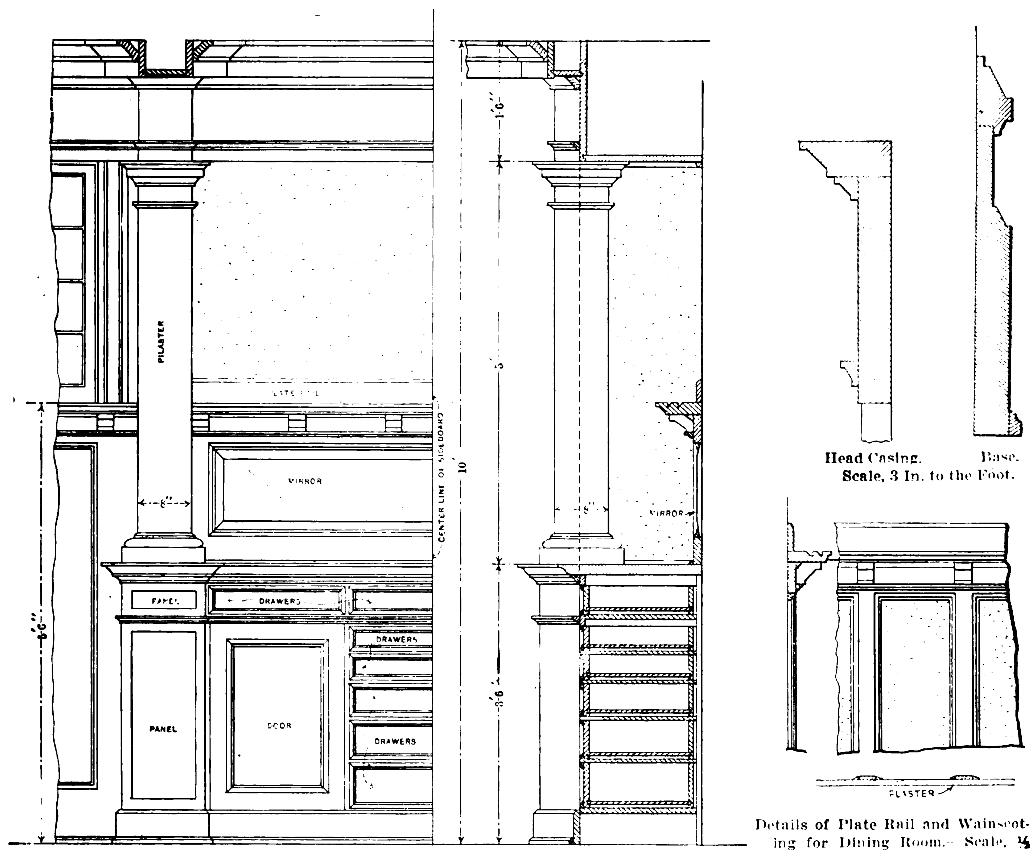
Design for a Southern Bungalow.—Section and Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

Complaint is made at conventions that the employers will not take apprentices, and the journeymen's unions are condemned for endeavoring to limit the number of apprentices to a given number of journeymen. On the other hand, we are told that the apprenticeship system is dead and that the trade school is the only solution of the question where we are to get our competent journeymen painters of the future. But there is another side to the question altogether. The New York Trade School, one of the oldest and best institutions in the country teaching the building trades, this year did not have a single student in the house painting class, although the classes for the study of plumbing, bricklaying, carpentry and electrical work were full to overflowing. There seems to be no desire on the part of the boys to learn painting.

Let us consider this question. We hear at the conventions a good deal about boys wanting clerkships and positions in stores and offices, where they can wear good clothes and need not soil their hands, even though these

You will find boys in every machine shop, in every cabinet making or wagon factory, in mills of all kinds, but you will find very few boys in the paintshops, largely because present conditions offer to the boys but a slight hope of future reward in the painting business. It is true that it requires but little capital for the journeyman painter to start in business for himself, but there are many men who will always lack the courage to start—and in determining whether to learn any trade it is the immediate future that is thought of. The master painter may train his own boy to follow in his calling and to take up his business when he is ready to leave off, but few journeymen painters care to have their sons apprenticed to a trade which they realize means idleness nearly half the time.

Every year it is getting more difficult to obtain a suffi-



Head Casing. Base.
Scale, 3 In. to the Foot.

Partial Elevation and Section of Sideboard in Dining Room.—Scale, ½ In. to the Foot.

Details of Plate Rail and Wainscoting for Dining Room.—Scale, ½ In. to the Foot.

Design for a Southern Bungalow.—Miscellaneous Constructive Details.

positions pay much less than a man can earn at one of the building trades. But we overlook the fact that the boy who is faithful to his employer in a store or office is reasonably certain of permanent employment, and though his weekly wage may be lower, he gets it for 52 weeks in the year, while many building trades employees are idle more than half the time, this being especially true of painters. And where the boy has a mechanical bent and a natural love for the building trades, he will find steadier employment and higher daily wages in almost any of the other trades than he will in painting.

Does it not seem reasonable, then, that the boy's parents prefer him to learn plumbing or bricklaying, tile setting or carpentry, for they naturally look forward to the future as well as to the immediate present.

We find comparatively little complaint about the lack of boys learning the other building trades, except as they are restricted by union regulations. And when it comes to the factory trades, where men are certain of steady work the year round, there is no lack of apprentices.

cient supply of skilled journeymen painters, and employers are compelled to depend on incompetent brush hands when they are not fortunate enough to secure the services of men who have learned their trade across the Atlantic. The situation is becoming such a serious one that it is high time the master painters, both organized and unorganized, woke up to it and began to study it from a new light.

The real problem is how we can make the business attractive enough to make boys want to learn the painting trade. Is it possible to so reorganize the business that the young man who enters it will be certain of reasonably steady work at a fair remuneration? This can be done only by the master painters refusing to take on every tramp painter who comes along in the rush season in order to push the work in hand through rapidly, and by using diplomacy with their customers so that they will permit the rush season to stretch out through the entire summer instead of confining it to a few weeks in the early spring and fall.

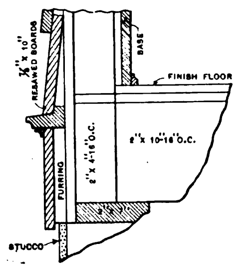
It will require a campaign of education among the property owners and real estate agents to effect a reform like this, but we believe it could be done by the trade generally acting in concert. Indeed, it can be accomplished to some extent by individual action, for we know master painters who do manage their business in such a way as to keep a comparatively small force of men almost constantly employed, instead of following the usual plan of hiring a large number of men for the rush seasons and letting them all go during slack times.

If this practice were generally followed we believe it would not only be easier to get boys to learn the trade, but it would bring about a better feeling between the masters and the journeymen painters generally, and would go a long way toward solving many of the labor difficulties that perplex the trade.

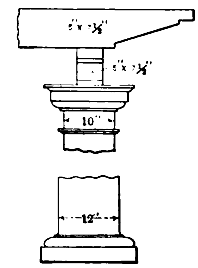
Plans are being formulated for a co-operative system of fire patrol between the Government Forest Service and the Lumbermen's Protective Associations in northern Idaho. Enormous destruction caused by fire the past season has made it imperatively necessary that some practical and systematic plan to protect the valuable timber lands in northern Idaho be adopted, hence the movement referred to.

Attaching Woodwork to Cement.

It occasionally becomes a problem to attach woodwork to cement, more particularly where it is necessary to place window casings in cement block buildings. One solution that has been recommended is as follows: Make all the sills and caps 2 in. narrower to allow a 2 x 4 or 2 x 8 (according to the thickness of the cap or sill) to be inserted in the wall the same as would be done with cut stone. Also make the water tables the thickness of the wall in one solid piece 4 ft. long, with spaces cored out for the joists.

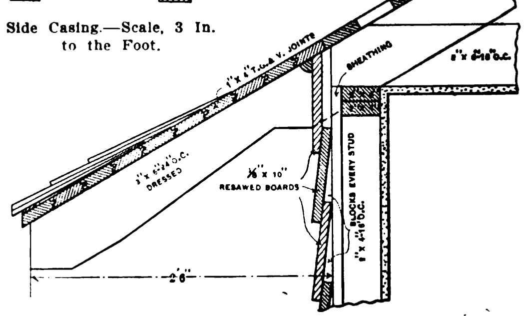


Detail of Water Table.—Scale, ¾ In. to the Foot.

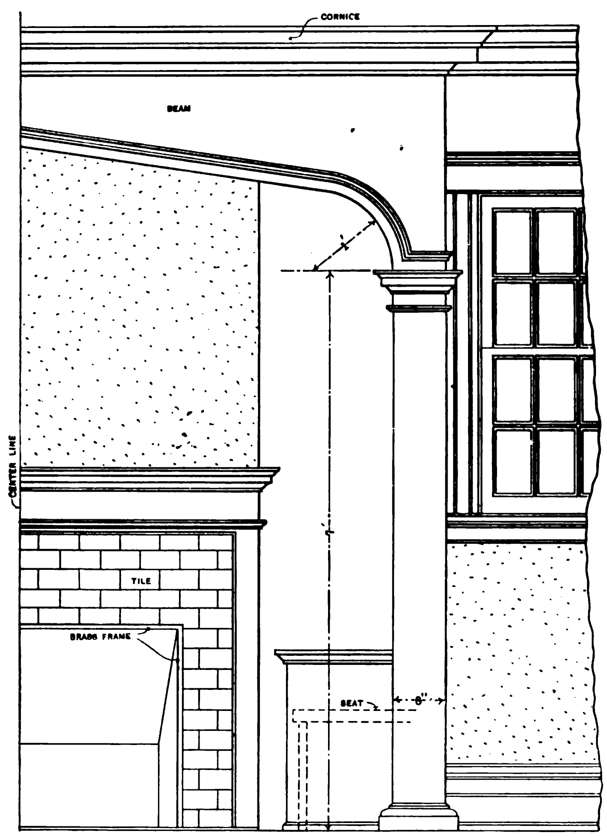


Detail of Pergola Columns and Beams.—Scale, ⅝ In. to the Foot.

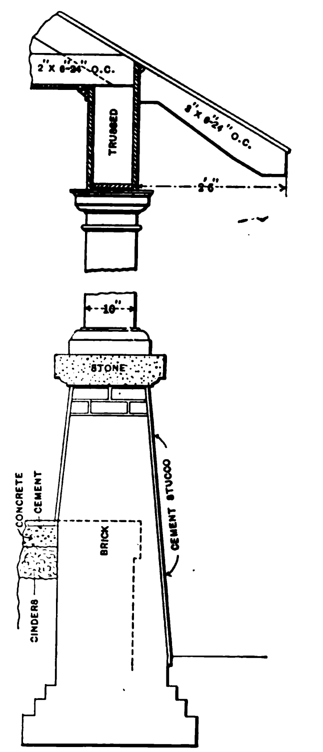
Side Casing.—Scale, 3 In. to the Foot.



Detail of Main Cornice.—Scale, ¾ In. to the Foot



Detail of the Nook in the Living Room.—Scale, ½ In. to the Foot.



Detail of Porch Column, Cornice and Pedestal. —Scale, ⅜ In. to the Foot.

Design for a Southern Bungalow.—Miscellaneous Constructive Details.

WATER POWER FOR CARPENTER SHOPS.

By Paul T. Lesher.

THERE are doubtless numerous carpenter shops throughout the country that are situated where it is convenient to install water power to good advantage—securing it from the city water mains or from a stream or brook. The means of utilizing this water power can be solved very readily by installing an impulse water wheel of such diameter to suit the required horsepower for driving the shop.

The idea of a water power is generally associated with a river or large stream, an expensive dam, huge flume, heavy grading and stone work, pits, curbing and penstock.

This is a wrong idea, for by means of an impulse water wheel, shown herewith, only a connection with the city water main is required if the shop is situated within the city limits, or if located in the country districts only a small diverting dam is required, then a pipe running along the surface of the ground to the water wheel. A small trout brook with a high head will often furnish as much power as a large stream under a low head, in a much more convertible form and at probably not more than one-fourth the outlay.

Water Wheel Table.

Pressure in pounds per sq. in.	Size of wheels.	2 ft. diam.	3 ft. diam.	4 ft. diam.	5 ft. diam.	6 ft. diam.
18	Horsepower....	1.5	4	7.5	11.5	16.5
	Revolutions....	240	160	120	95	80
22	Horsepower....	2.5	5.5	10.5	16.5	23.5
	Revolutions....	270	180	135	106	90
26	Horsepower....	3	7.5	13.5	21.5	31.3
	Revolutions....	290	196	145	116	95
30	Horsepower....	4	9.5	17.5	27.5	39.5
	Revolutions....	320	210	160	130	105
35	Horsepower....	5	12.0	21	33.5	48
	Revolutions....	340	230	170	137	110
40	Horsepower....	6	14	25.5	40	57
	Revolutions....	360	240	180	145	120
44	Horsepower....	7	16.5	29.5	46.5	67
	Revolutions....	380	250	190	150	125
52	Horsepower....	9	22	39	61.5	88.5
	Revolutions....	420	280	208	166	138
60	Horsepower....	12	27	49	77	112
	Revolutions....	450	300	220	180	150

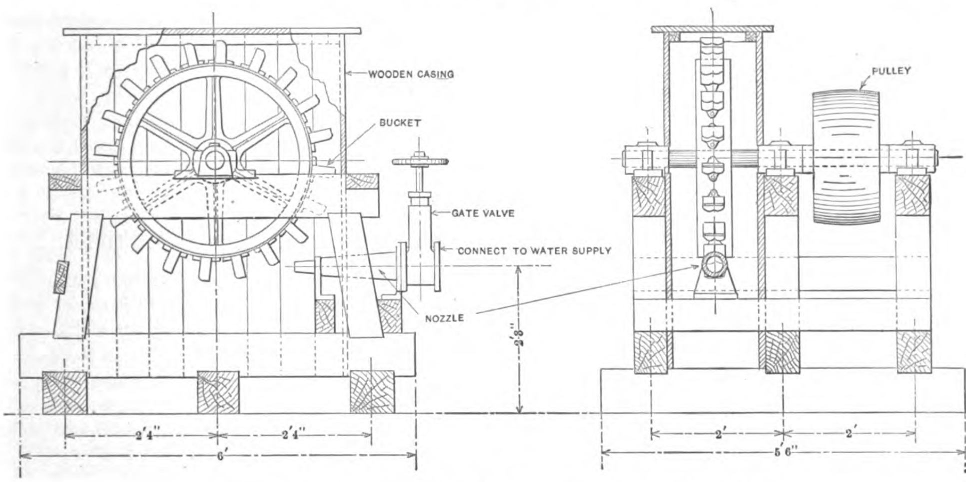
The simplest form of the impulse wheel consists of a cast iron or steel center, to the periphery of which are attached cups or "buckets," as they are technically called. The high efficiency of the wheel is largely due to the design and construction of these buckets. The wheel is carried on a horizontal shaft, supported by journal boxes. The water, being led to the wheel by means of a pipe, impinges on the buckets through a nozzle, the end of which is fitted with a cylindrical tip of diameter proportional to the head of water and amount of power to be developed.

The power of the wheel depends upon the head and amount of water applied to it; in other words, the size of nozzle used.

The diameter of the wheel determines its speed, and under a given pressure the number of revolutions at which a certain size wheel will run should be constant, irrespective of the power developed.

The metal parts of the wheel can be bought from several companies who manufacture impluse water wheels, the cost being very moderate and the party installing the wheel can build the framework, or if desired can build the complete wheel themselves.

The typical arrangement of an impluse water wheel, which is an ideal machine for shop use, is here shown, as well as the "Water Wheel Table," giving the diameters of wheels, revolutions per minute and pressures per square inch, to develop certain average horsepowers, the wheels being equipped with buckets of good design. The discharge pipe should be of ample diameter to carry the water away from the wheel without backing up.



Side and End Elevations of a 3-Ft. Diameter Impulse Water Wheel.

Water Power for Carpenter Shops.

Formulae for Creosote Shingle Stain.

A good grade of shingle stain is made by thinning the oil color required to give the color to the stain with a mixture of 4 gallons of raw linseed oil, 2 gallons of creosote oil and 1 gallon liquid dryer, says a recent issue of the *Painters' Magazine.* The color should be permanent and nonfading, and it is best to have it of the consistency of house paint before adding the thinners referred to.

If to be used for dipping, 1 gallon of paint to 7 gallons of the thinners referred to is sufficient. For brushing, 2 gallons of paint should be used.

For a cheaper grade, the thinners may be made by mixing 3 gallons water white 150-degree test petroleum oil, 3 gallons creosote oil and 1 gallon liquid drier.

The commercial name of the creosote required is coal tar creosote, but crude carbolic acid may be used in its place. Neither, however, should be too dark in color.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - - TREASURER
GEO. W. COPE, - - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

AUGUST, 1909.

Six Months Local Building Operations.

With the building season at its zenith and operations in progress in every section of the city upon a scale which is giving employment to thousands of mechanics in all branches of the industry, it is interesting to note the extent to which the current volume of business compares with that for the corresponding period a year ago. It is to be borne in mind that the country was then slowly emerging from a period of severe depression, so that a comparison of figures is not as significant of a steady growth as might otherwise be the case, yet the statistics of building operations afford an excellent barometer of the tendency of the times. Since the first of the year the volume of new work projected in the boroughs of Manhattan and the Bronx has shown a pretty steady increase as against the same time last year, the total value of the improvements for which permits were issued during the first six months of 1909 slightly exceeding the one hundred million dollar mark. Just how significant this is may be gathered from the fact that the total compares with $46,034,156 in the first half of 1908, and at the same time constitutes a record greater than that of any corresponding period in the history of the metropolis. The two best years in building New York ever had were 1905 and 1906, in the first six months of which plans were filed for new buildings to cost about $80,000,000 and $90,000,000, respectively. In the number of buildings for which permits have thus far been issued, the present year is not keeping pace with either of the two years mentioned, although the total estimated cost is much greater. This is due to the fact that current building has been of a more pretentious character, involving an investment of greater capital, while the operations have been less in number. In fact, the city is about 500 buildings behind the record of the first six months of 1905, but nearly 900 buildings ahead of the first half of 1908. With the present tendency it will not take long to bring matters to a normal condition, more especially as the recent fall in the prices of brick and cement is fast bringing many important projected improvements to a head and permitting others held in abeyance to be carried to a successful completion.

Building Statistics.

While the total value of the building improvements projected in the first six months of the current year broke all records, the figures for June in the Borough of Manhattan showed a heavy shrinkage, not only when compared with the month of May, but also with June of last year, when business was at a low ebb, the totals being $8,929,000 and $15,594,000, respectively. The six months' figures, however, bring the totals to $78,585,400, as against $38,915,200 in the first half of last year. In the Bronx the results are still more striking, due to the tremendous amount of new construction work in the way of housing accommodations, rather than business buildings. In June new work to the value of $2,855,600 was planned, while in the same month last year the total was $1,630,200. For the first six months of this year the total was $22,092,760, as compared with $6,829,500 in the same period of 1908. What is still more striking is that the total for the first half of the current year exceeds by something over $600,000 the total for the 12 months of last year in this borough of Greater New York. Of the $22,092,760 involved in the first six months' operations, a trifle over $15,000,000 was for flats and apartment houses, while a little more than $4,000,000 was for private dwellings. In Brooklyn there was a perceptible increase in operations in June over a year ago, the figures being $6,898,000 and $2,647,600, respectively. For the six months of the current year the estimated cost of the building improvements for which the 5100 permits were issued was $28,785,500, while in the same period last year 2340 permits called for an outlay of $13,121,118, these figures not including the amounts expended for alterations. There is a vast amount of building in progress in the outlying districts, where two-family houses are much in vogue, and also in the Borough of Queens, where suburban tracts are being improved with great rapidity, due in a measure to their greater accessibility through the completion of the bridges which span the East River. All things considered, the building outlook for 1909 is of a most encouraging nature.

New York's Tallest Skyscraper Hotel.

Although the Eastern metropolis, by reason of its cosmopolitan nature and the vast throngs of visitors which are daily in evidence, is essentially a city of many hotels, yet a constant increase to its housing accommodations is not only necessary, but imperative. Additions are constantly being made to the number of imposing hostelries which are to be found thickly dotting what may be termed the central section of the city and as each new one is designed it is made a trfle larger, taller or more magnificent than its predecessor. Owing to limited ground area the natural tendency is upward and while the city can boast of hotels ranging from 11 stories, as in the case of the Waldorf-Astoria, up to the 21 stories of the Gotham and the Belmont, yet it would seem that the limit had by no means been reached, for plans have recently been drawn for what will be New York's tallest skyscraping hotel, rising at it will to a hight of 31 stories, or a trifle more than 376 ft. above the level of the curb. It will have a frontage of 98.1 ft. on Madison avenue and extend 144 ft. on Forty-second street. It will be of modern fireproof construction throughout and it will cost something in excess of $2,000,000. According to the plans of Architects Helmle and Huberty of Brooklyn, an unusual feature of the building will consist in the fact that it will be constructed around and completely shut in the property about 30 ft. square now known as 312 Madison avenue. The scheme is to build up all around this lot and make the space a court or light shaft in the building. The structure will have a handsome façade in the modern Renaissance style of architecture, decorated with bays at the three lower stories and additional bays set between pilasters and finished with elaborately decorated stonework at the upper stories. As regards the hight of the building, an interesting comparison is afforded by the statement that the Plaza and St. Regis hotels are each 18 stories in hight; the Knickerbocker 15 stories; the City Investing Company's Building 33 stories; the Singer tower 41 stories, and the Metropolitan tower 53 stories, with a total hight of 700 ft. From this it will be seen that while the contemplated hotel will be the tallest hostelry in the city it will not out-top some of the other structures for which Greater New York is noted.

Some Causes of Leaky Slate Roofs and Their Remedies.

A writer who has had an experience of many years chiefly in connection with slated roofs describes some of the causes of roofs leaking and points out remedies for the trouble in a recent issue of our London contemporary, *The Illustrated Carpenter and Builder*. He intimates that there are few, if any, roofs that do not at some time or another allow water to enter the interior of a building, staining the ceiling and doing other damage. He states that the two leading principles in connection with roof work are the pitch of the roof and the mode of covering it. He points out that the flatter the pitch the larger the slates and proportionately increase of lap, while the steeper the pitch the smaller the slates and less the lap. What he further says on the subject is of such general interest that we present it herewith.

On more than one occasion when the writer has had to repair a roof that looked perfectly sound, he has been told by the tenant that the leak appeared only after very heavy rains, and on removing a few slates over the defective part he has not found any broken or cracked slates to cause the leak. In other words, the roof is flat pitched, the slates are small, and the lap insufficient.

To remedy the defect, and where appearance is no object, an easy way out of the difficulty, and one that does not involve stripping the roof, is as follows: Remove about a dozen slates centrally over the spot where the rain has soaked through. If the existing slates are 16 in. by 8 in. or 20 in. by 10 in. procure some larger slates, trim down to the same width as existing slates but not the length, so that the extra length will give an extra lap to that portion of the roof affected. If, however, through weakness of roof timbers, a part of the roof has become concave on the surface the rafters should be firred up and the slates refixed.

Another and very frequent cause of leakage is where the roof abuts against the walls. It should be remembered that a great safeguard against leakage at this point is the insertion of a tilting fillet at the time of constructing the roof previous to covering in. It helps to keep the rain from percolating beneath the slates or flashings. The tilting fillets, though very essential, are in a good many cases omitted. They should be fixed at the junctions of walls and roofs as well as at the undereaves. There can be little doubt that flashings make the best finish at these points. Cement fillets do not, generally speaking, last long. The vibration of the roof in stormy weather causes the cement to become detached from the slates, leaving a gap for rain to enter, as the fillet has a better key and adheres firmer to the brickwork than the smooth slates. It would be better for the fillet to be oblong rather than angular in section, so that the greater part is on the roof. Were the fillet composed of lime and hair gauged with cement it would be an advantage over the usual cement and sand.

The bond of slating should be regular throughout, as any variation has a tendency to allow rain to enter the roof, especially during heavy storms.

In order to economize slates sometimes the undereaves are composed of small pieces of slates just sufficient to break the joint, &c., but this should not be allowed. Rain falling on a roof increases in volume as it gets nearer the gutters and consequently the undereaves course should be composed of full width slates as well as any other part of the roof, for if not so constructed it is liable to allow the rain to find its way to the interior of the building.

A good sound slated roof requires:

(a) Tilting fillets at gutters and at junction of walls.

(b) No cement fillets but proper flashings wedged and pointed to the brickwork or stonework.

(c) The bond properly kept throughout.

(d) The lap regulated according to the pitch of the roof.

A Hardwood Curiosity.

A curiosity in hard woods has been found in the Chitum tree, in Madison County, northern Alabama. This tree, says an Exchange, has been identified, with some authority, as identical with the Shittim wood mentioned so frequently in the Bible, and especially in connection with the building of Solomon's temple and the construction of the Ark of the Covenant. A Government forestry expert has given it as his opinion that nowhere else in the United States can it be found.

Chitum, or Shittim, wood is remarkable for its tough fiber. Fence posts made 40 to 50 years ago are still shown in Madison County, the wood having stood the ravages of time almost without deterioration. The tree is marked by a diameter not exceeding 18 in. and a hight of not more than 35 ft. In the spring it is covered with small and delicate purple flowers.

Because of its apparent rarity no attempt has been made to manufacture the lumber, except in a few scattered cases. From it some pieces of furniture have been made, the wood taking a high polish and showing up to excellent effect. Walking sticks and other novelties have been made. It is probable that a further attempt will be made to classify and identify the tree.

Officers of the National Hardwood Lumber Association.

At the twelfth annual meeting of the National Hardwood Lumber Association, held in Detroit the second week in June, the following officers for the ensuing year were elected:

President, O. O. Agler of Chicago.

First Vice-President, F. A. Diggins of Cadillac, Mich.

Second Vice-President, F. S. Underhill of Philadelphia, Pa.

Third Vice-President, O. E. Yeager of Buffalo, N. Y.

Secretary and Treasurer, F. F. Fish of Chicago.

It was voted to hold the next convention in the city of Louisville, Ky.

Preserving Blueprints.

In order to preserve blueprints, which are apt to fade when brought into the sunlight or even in a strong light, without being in the direct sunlight, the following remedy is recommended by the *American Machinist:* Expose the prints until badly burned and then wash in clear water until all the emulsion is removed. While still wet lay print, with the blue side up, on a smooth surface, and by means of a paint brush cover the print smoothly with peroxide of hydrogen. This will bring out the background very blue and the lines perfectly white, and make a print that will not fade to any extent in the sunshine.

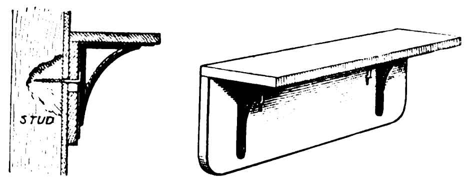
As a general proposition it has usually been considered that frame construction was much cheaper than brick, but just at the present time, with masons' materials at a low level of cost, statistics compiled by the Bureau of Buildings of the Borough of the Bronx, New York, show very little difference in cost between brick dwellings and frame dwellings of the same dimensions.

A method of lowering the temperature of the rooms in an apartment house in very hot weather is to wet the roof of the building with water early in the day by means of a garden hose attached to the stand pipe or connected with the bathroom in the flat on the top floor. After a good drenching the sun does the rest, for, when the water evaporates, the roof cools off.

CORRESPONDENCE.

A Removable Shelf.

From J. C. G., Pottsville, Pa.—A form of removable shelf which does away with nailing or screwing to the wall, tearing the paper and pulling out chunks of plaster by missing the studding or joints in a brick wall, is shown in the sketches which I inclose. The construction is such that the shelf can be perfectly adjusted, and when it is desirable to repaper, paint or clean the room it can be readily taken down out of the way and after the work is done replaced without trouble. All that is



Sectional and General Views of Removable Shelf.

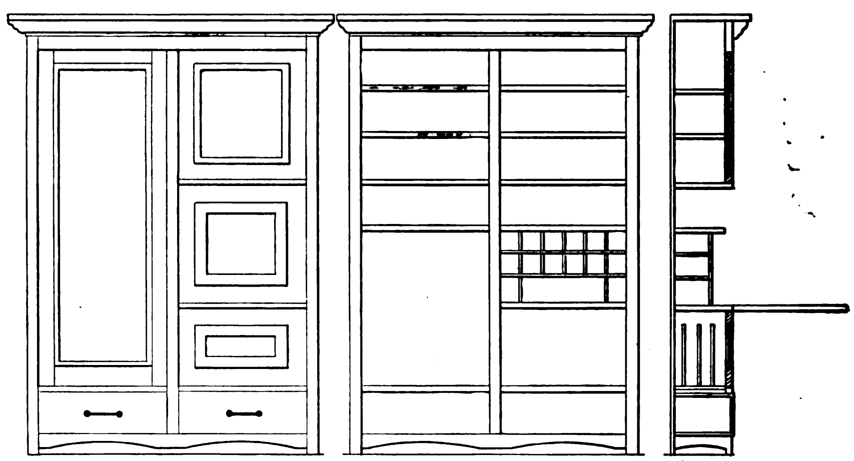
required are two angle screws about 2½ in. long, and after locating the studding or mortar joints turn in the screws to within the thickness of the board on the back of the shelf. Gauge the shelf from the top on the back so as to get the holes at an even hight. Center the shelf between casings, set it on the hooks to mark off the holes and then cut them only large enough to hold the hooks to pass through and press the shelf firmly down. If out of level make one cut a little higher than the other and the shelf will be complete, level, safe and removable.

I am using this idea of shelf construction in my own home and it works with entire satisfaction; therefore I am telling the readers of *Carpentry and Building* about it. The sketches represent a section through the shelf, also a general view clearly indicating its appearance completed.

Combination Wardrobe, Bookcase and Desk.

From F. T., Sidell, Ill.—I am sending a blueprint of a combination wardrobe, bookcase, desk and music rack, which may possibly prove of interest to some of the many readers of *Carpentry and Building.* I am building the case of red oak, the size over all being 4 ft. 10 in. by 7 ft. and 18 in. deep. There is one plate glass 20 x 60 in. and another 20 x 18 in., with ½-in. bevel. The balance of the door is paneled. The blueprint shows the appearance of the case with the doors closed and also with the doors removed, while the sectional view indicates the construction. The writing shelf is shown lowered or dropped ready for use.

I am greatly interested in *Carpentry and Building,* as I find it a very valuable paper and one that is of great assistance to the practical man. I have been taking it nearly six years and have every copy but one. I could not think of parting with my copies, for they have been the direct cause of my sitting in the easy chair now.



Combination Wardrobe, Bookcase and Desk.—Elevations and Section.—Scale ⅜ In. to the Foot.

Criticism of First Prize Design in Bungalow Competition.

From A. S. W., Yonkers, N. Y.—I have noticed several criticisms of the first prize design in the Bungalow Competition, and have wondered that none of them seemed to dwell on one very important feature—that is, the manner in which Mr. Fidler has given his estimate of cost.

In his estimate he gives the cost of labor at 5 per cent. of the cost of materials. I fail to understand how Mr. Lilly expects to pay his men the wages stated at these figures.

Taking for an example two of the leading branches of the work, it means that two men could frame and complete the outside of the bungalow in nine days' time, and the same force could trim and finish the interior complete in two and a half days.

According to the same rate, we have $7.25 for labor to lath and plaster the walls and ceiling. Allowing $1.25 for lathing, we still have $6 left for which to apply 483 sq. yd. of plaster, two coat work. This would give the plasterer and his helper a little over one day to do the work.

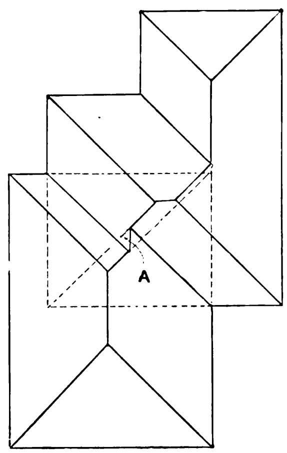
However, I would like to hear from Mr. Fidler on the subject, and it would no doubt interest other readers of this journal to have the matter clearly explained.

He surely did not intend the 5 per cent. to represent simply builder's profit, as it is clearly stated in the announcement of the conditions governing the contest that the cost of labor must be given separately from the cost of materials.

Answer.—The above comments were submitted to A. H. Fidler, the author of the first prize design in the Bungalow Competition, who replies as follows:

In regard to the submitted criticism, I would say that I have gone over the correspondent's comments very carefully, both alone and with Mr. Lilly, the contractor. We both are of the opinion that "A. S. W." must be writing simply for the sake of writing, or else he does not comprehend the published statements, for he says in the last paragraph of his letter than the 5 per cent. surely cannot represent simply the builder's profit, because the conditions governing the contest state that the cost of labor must be given separately from the cost of materials.

Does "A. S. W." think that builder's profit is cost of labor, or does he think the builder should have no profit? When he says "builder's profit" it means just what it says; namely, the amount of money Mr. Lilly would receive for furnishing the labor, appliances, &c., necessary to complete the building according to the drawings and specifications. It is ridiculous on the face of it to think that any building of this size could be put together for 5 per cent. of the cost of materials, especially when there is nothing to lead one to that idea. In commenting on the detailed estimate of cost, "A. S. W." evidently



Roof Plan for Dwelling, Contributed by "H. J. K.," Denver, Colo.

makes a jump at the whole and lands on two parts—"carpenter work" and "plastering."

Under the heading "Plastering" he reads as follows:

> Plasterers, per hour, 50 cents.
> Plastering per square yard, price to include lathing, 30 cents.
> Plastering complete $145

He then sets down on paper $145, gets 5 per cent. of it and finds it to be $7.25. He very generously allows $1.25 to have the lath put on by the "presto-change" method, and leaves all of $6 for the plasterer and helper to plaster the bungalow in a few minutes over one day. This is exceptionally brilliant figuring, when at the very outset Mr. Lilly states that he allows 30 cents per square yard for plastering, including lathing.

How "A. S. W." figures that the bungalow in question should be finished on the exterior in nine days and on the interior in two and a half days we are too dense to comprehend, but have come to the conclusion that if the correspondent arrived at these figures as he did the plastering we are excused.

When Mr. Lilly made out the detailed estimate of cost he gave under each heading the rate of wages charged in Jamestown per hour or day, as the case may have been, so that the cost of labor as a whole does not appear any more complete than it did in the first prize design in the Two Tenement House Competition last year. They were, however, both sufficiently complete to satisfy the judges. Mr. Lilly says that when he figured the wainscoting, for example, he figured it so much per foot put up; the beamed ceiling so much per foot in place, and so on throughout the work, and he says he is waiting for all the chances he can get to build the bungalow exactly as it appeared in *Carpentry and Building* for the amount there given.

Design for Cabinet Maker's Tool Chest.

From R. W. M., Uniontown, Pa.—If "J. A. B.," New Westminster, B. C., whose inquiry appears on page 219 of the June number of the paper, will let me know about what size tool chest he wants, and name the tools it is to contain, I will be very glad to send him a couple of designs through the Correspondence columns.

Roof Plan for Dwelling.

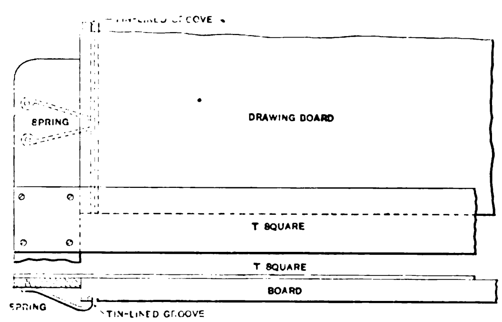
From H. J. K., Denver, Colo.—In the June issue of the paper is a roof plan from "R. H. C.," San Antonio, Texas, contributed in reply to the request of "G. W. G." in the May number. He says that at the point A of his plan is a small valley, but I do not agree with him. If he ran his valley line in the other direction it will be a ridge. In the roof plan which I send herewith is shown the correct arrangement. It is a case where two roofs are telescoped into each other and by extending the valley lines over to the hip rafters and then combining the hips we have the ridge. I do not know the English name for it, but hope some old English reader will furnish it for the benefit of all who may be interested. In the old country we have a name for it that means about the same thing as "folding."

Clapboarding Plank Frame Barns.

From E. W. T., Delanson, N. Y.—I have never before asked for any help through the Correspondence columns, but I have one question to ask which I wish Mr. Shawver or some one else well versed in plank frame barn construction would answer for me. I have never seen a drawing where the barn was studded for clapboarding only. Now, what is the proper way to cut in studding for bevel clapboarding, with 18-ft. posts and no sheathing?

Device for Holding T-Square.

From F. M., Brooklyn, N. Y.—A method of holding a T-square firmly to the end of the drawing board in proper position while using it at an incline or holding it in the lap is shown in the sketch and may be of interest to some of the readers. The groove is cut in the end of drawing board and a tin slot tightly fitted and nailed with small brass brads. The spring used is cut from any good sized spring, such as a bed spring, not too stiff, or



Device for Holding T-Square.

piano wire will do. Fasten with screws to the top of the T-square and turn the end to move firmly and truly in the tin groove on the board, as shown by the sketch.

Building Stairs with a Continuous Handrailing.

From L. H. H., Chicago, Ill.—Permit me to suggest in reply to "S. P. M.," Sterling, Ill., that while as a rule the old method of continuous handrailing as practiced in the '70's is to a certain extent out of date, I find that there is no information obtainable from any source as to the problems it involved, which does not possess an intrinsic money value to the student who masters it. Fully 30 per cent. of good stairways require a turn out at the bottom or a single newel may be set at the top floor requiring a wreath piece, &c. Having had charge of carpenters and building mechanics generally since 1875, during which time I have worked a fair sized regiment of carpenters, any of whom could solve the problem 2 x 2 = 4, I find my experience the reverse of that described by "S. P. M." My private opinion is that about one out of 10 carpenters, taking them just as they are, can be entrusted with the stairway in the ordinary $2000 or $3000 residence. In the building business more than any other in the world I would say to the younger brothers, "Knowledge is power."

Wainscoting an Oval Room.

From C. J. M., St. Johns, Newfoundland.—In looking over the June number of the paper I noticed the letter of "G. H. G.," Philadelphia, Pa., in which he describes an oval apartment which is to be fitted with wainscoting. The correspondent does not say whether the apartment is already built or is yet to be constructed, or whether the walls are of wood or of masonry. This, however, is of little consequence if the apartment is truly elliptical in plan, which is, I assume, what the correspondent means when he says "oval."

If the room is already built the first thing to be done is to prove whether or not the walls are true and find the center of the floor, one way of doing which is as follows: First find the place on the floor where the largest circle may be described between the walls and the center of this circle will be the intersecting point of the major and minor axes. Next procure a batten or narrow board 2 or 3 ft. shorter than the longest diameter of the room; strike a straight line on the center of this board and saw off the corners so as to bring it to a point in both ends, as indicated in Fig. 1 of the diagrams. Having found the center of the largest circle that can be described between the walls, pivot the board exactly in the center upon the center of the circle and turn it about until both ends touch the wall. Mark the wall where the points of the board touch. Now turn the board in the opposite direction until its points touch and again mark. Find the exact center between the marks on the wall at both ends of the room, between which points draw a straight line. This line should pass through the center where the board was pivoted and form the major axis of the ellipse. Another line should now be drawn through the center at right angles to the one just described, which will be the minor axis. The above description will be readily understood from an inspection of Fig. 1.

Having found the major and minor axes, the walls may be proved in the following manner: Procure a rod somewhat longer than half the major axis and on it lay off from one end half the length and half the width of the room, measured on the lines drawn on the floor, and square a mark across the rod at both lengths. Lay the rod upon the floor in line with the minor axis, with the end touching the wall. The short mark will now be on the center or intersection of the two axes. Swing the rod around either to the right or to the left, always keeping the marks on it fair with the lines. If the end of the rod touches the wall in all places when the marks are fair on the lines drawn on the floor to represent the major and minor axes, then the walls are a true ellipse. If, however, in some places it does not touch and in other places touches too much, the walls are not true and something of a difficulty confronts us. The only way to remedy the trouble is to fill up the hollows and "dub" off the humps. A moment's inspection of Fig. 2 will readily show what is meant to be conveyed by the above description. In Fig. 2 A B is the major and C D the minor axes, *a b* the rod and *c d* the marks for the lengths of the semimajor and semiminor axes.

Having found that the plan of the room is a true ellipse, we will now proceed to lay out the panel work for the wainscot. It will be necessary to have a floor large enough to lay off at full length the minor and major axes of the ellipse. Then to make the templates for the different pieces of the curved paneling proceed in the following manner:

Referring to Fig. 3 of the diagrams, let A B represent the major and C D the minor axis of the ellipse. Procure a rod similar to the one used in proving the plan of the room. From one end of this rod lay off half the minor and half the major axes of the ellipse, as *a c* and *a d*. By keeping the marks of the rod fair on the lines as shown while the rod is moved to the right or to the left and by making marks at the end of the rod at each move any number of points may be found in the curve.

The true joints of the ellipse may be found thus: Again referring to Fig. 3, take D as a center and with radius A *o* describe an arc cutting the major axis in the points E and F, as indicated by the dotted line. Then from any point as *e*, where a joint is to be made, draw lines to E and F as shown; bisect the angle E *e* F by the line *c f*, which will be the joint required.

One section of the work will be sufficient to lay out

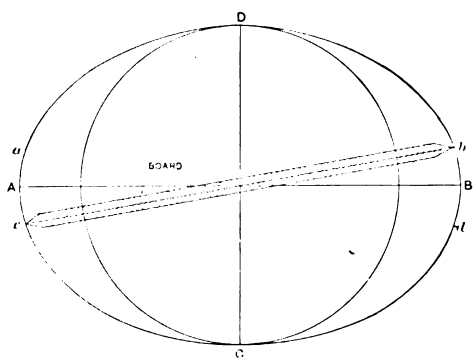


Fig. 1.—Diagrams for Finding Center of Floor.

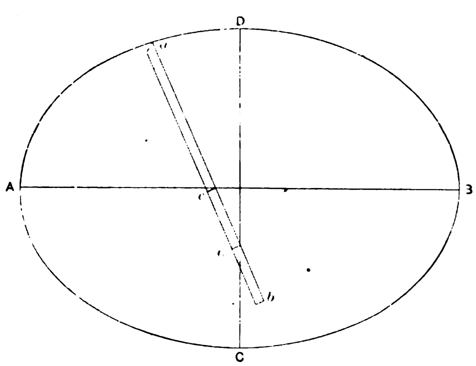


Fig. 2.—Method of Proving Whether or Not Walls Are True.

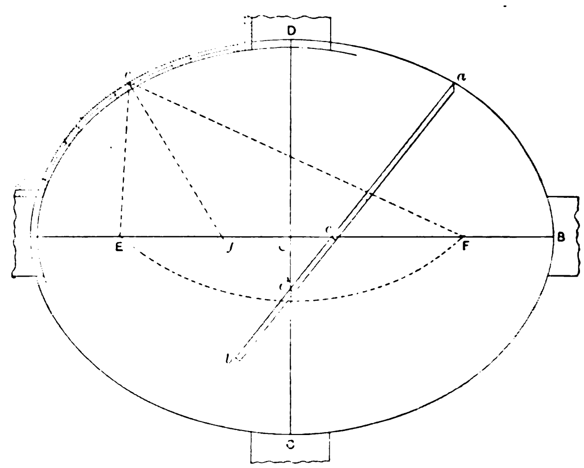


Fig. 3.—Showing Method of Making Templates for the Different Pieces of Curved Paneling.

Wainscoting an Oval Room.—Method Suggested by "C. J. M."

for the templates, for if the room is truly elliptical they will be interchangeable by turning them over. If the plan is not true and the four sections of the work as shown by the correspondent's drawing are not exactly alike, the simplest way will be to make a template for each section of the wall and make each piece of the work to fit the place to which it belongs.

Roof Plan for "W. V. W.'s" House.

From F. L. G., San Antonio, Texas.—The roof plan, Fig. 1, which I am sending is in answer to the inquiry of "W. V. W.," and will, I think, serve his purpose. There is a gable at the front and one on the side, with a hip in the rear that could be made into a gable if the correspondent so desired. I would like to call his attention to the fact that his house according to the floor plan measures 34 ft. at the rear, while the front measures 33 ft. 6 in.

From H. J. K., Denver, Colo.—Inclosed herewith find roof plan for "W. V. W.," Scottsburg, Ind., whose letter appears on page 216 of the June issue of the paper. By means of the dotted lines in Fig. 2 I have indicated where to start the hips. The plan is so clear that I feel sure no extended explanation is necessary.

From W. B. A., Onaga, Kan.—In response to the request of "W. V. W.," Scottsburg, Ind., in the June issue, I am sending a roof plan, Fig. 3, which I think is sufficiently clear to need no extended explanation. I discovered a mistake of 6 in. in his figures, making the front of his house that much narrower than the rear, but I have adjusted the matter in the sketch which I send. This apparent discrepancy, however, would not affect the working out of the plan in the least.

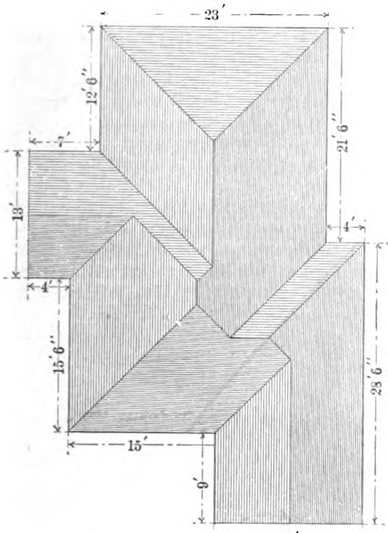


Fig. 1.—Plan Furnished by "F. L. G."

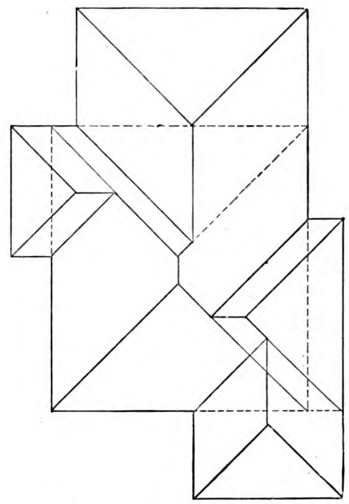


Fig. 2.—Solution of "H. J. K."

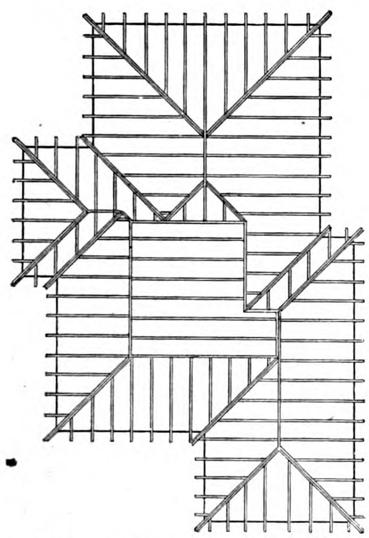


Fig. 3.—Framing Plan Contributed by "W. B. A."

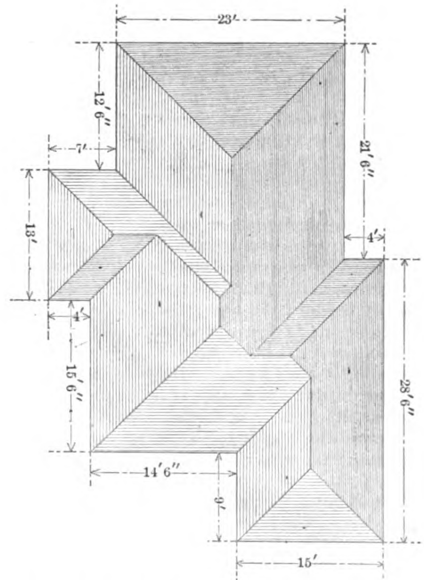


Fig. 4.—Plan Received from George W. Buck.

Roof Plan for "W. V. W.'s" House.—Contributed by Various Correspondents.

From George W. Buck, Instructor in Carpentry, Hampton Normal and Agricultural Institute, Hampton, Va.—In answer to the request of "W. V. W.," Scottsburg, Ind., on page 216 of the June issue of *Carpentry and Building*, wherein he asks for a design of roof that will best become the floor plan shown, I inclose a sketch, Fig. 4, prepared by Frederick Sharp, a senior member of the carpentry class of 1909 of the Hampton Institute, which I think will answer his purpose. The building being 6 in. narrower at one end than at the other prevents the side walls from being parallel.

SOME PROBLEMS IN STAIRBUILDING.—IX.

BY MORRIS WILLIAMS.

W

E will now take up the explanation of a third method of treatment for a scroll hand rail to stand over and above four sweep steps contained in the scroll curve, the plan of which was shown in Fig. 50. It will be remembered that the first method exemplified the construction of a wreath standing over and above one-quarter turn only of the plan scroll curve, as shown from *c* to *a* in Fig. 60, and that the second method exemplified the construction of a wreath in two sections standing over and above two quarter turns, also shown in Fig. 60 from *c* through *a* to *n*.

At the present time we shall show how to construct a wreath in one section to stand over and above a part of the plan scroll curve more than a quarter turn and less than two quarter turns, as indicated in Fig. 60 from *c* to *h*. The plan curve of the center line of the wreath is shown to be drawn from the center *o*. The plan tangents according to this operation will not be at right angles to one another, as was the case in the other operations.

From *o* draw a line to *h*, and at right angles to it draw the level plan tangent *h g*. The other plan tangent will be the line from *g* to *c*, and the angle between them at *g* is an acute angle—that is, an angle less than a right angle. Draw a line from the center *o* to *e*, parallel to the level tangent *h g*. This last line will be the plan of the minor axis because it is a level line drawn parallel to the level tangent from the center *o* of the curve.

Now erect perpendicular lines from *c*, *e* and *g*, and upon the line drawn from *c* measure to the point 4 the hight of four risers, which are contained in the curve of the scroll, as shown in Fig. 50. From 4 draw with the pitch board the two steps marked 5 and 6, which are outside of the scroll curve. Now draw a side view of the straight rail upon these steps, with its center line upon the nosing of the steps.

Determine the hight you will have the eye of the scroll above the top of the curtail step, as shown from *l* to *a* upon the line *c c*. From *a* draw a level line through *g'* to *h'*, and the portion from *g'* to *h'* will represent the elevation of the plan tangent *g h*. It is made the same length as the plan tangent *g h* because it is level, and, as shown, it is located at the hight of 6 in. above the top of the curtail step.

It is now required to find the elevation of the other plan tangent *c g*. To do this draw a line from *g'* upon the level tangent to *c'* and beyond, to cut the center line of the straight rail of the flight. This line will be the elevation of the plan tangent *c g*. Draw the easement upon the straight rail to align with the inclined tangent *c' g'*, and make the joint square to the line of the tangent.

We have now found the pitch and length of the tangents *c' g'* and *g' h'*, the former being inclined and the latter lever. These lines represent the face mold tangents.

To draw the face mold the lengths of these tangents are to be transferred to it and the angle between the two, as required upon the face mold to square the joints, must be found. From *h* in the plan draw the line *h m* square to the floor line and from *m* draw the line *m* F *h''* square to the inclined tangent *g' c'*.

Now place one leg of the compasses in *g'*, extend the other to *h'* and turn over to *h''*, as shown by the arc *w*; connect *h''* and *g'*. This last line is the level tangent transferred onto the face mold, while the other tangent of the face mold is the inclined tangent *g' c'*. The angle between the two, as required upon the face mold to square the joints at each end, is shown at *g'*.

Referring to the section, draw a line from *e'* to *o'* parallel to the line from *g'* to *h''*, making it equal in length to the line *o e* of the plan. The line *e' o'* of the section will be the minor axis of the face mold. Now draw the major axis square to the minor, as shown from *o'* to *h''*. The center line of the face mold is shown drawn upon the section from *c'* through *e'* on the minor axis to *h''*.

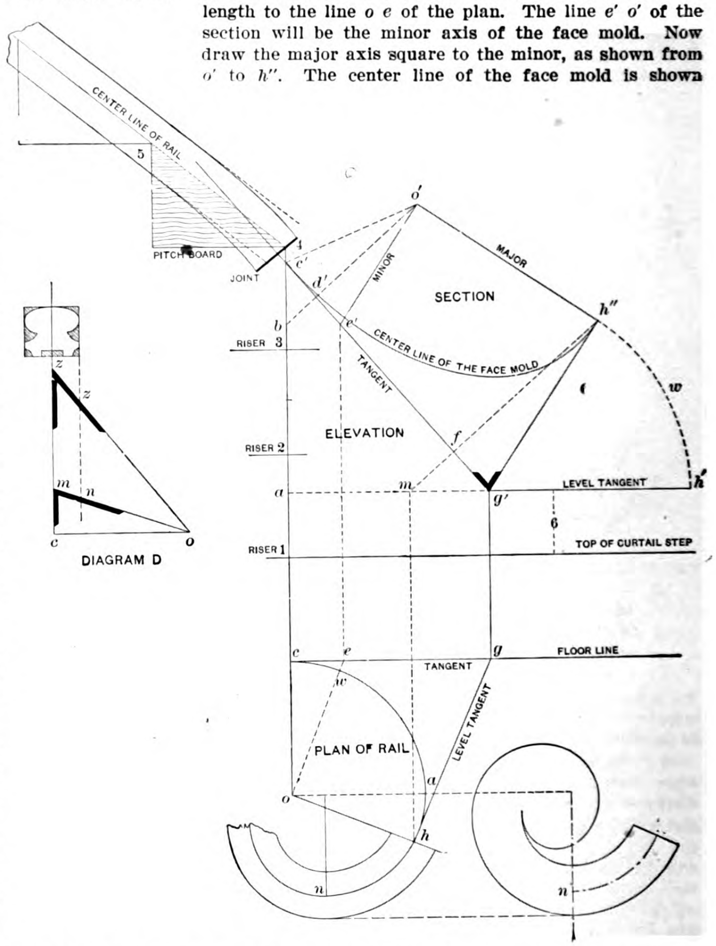


Fig. 60.—Plan and Elevation of One Piece of Wreath Covering a Curve Greater Than a Quadrant, the Curve Being a Part of a Scroll.

Fig. 63.—The Eye Portion of the Scroll Curve.

Some Problems in Stairbuilding.—IX.

Having shown how to find the length and angle between the tangents of the face mold and also the minor and major axis, it will be a very simple process to draw the face mold complete. How this is accomplished is represented in Fig. 61 of the diagrams. Draw the straight line X Y and transfer to it from the inclined tangent in the previous figure the points 4, c', d', e', f and g'. From f draw the line f h square to X Y. Draw d o from d square to X Y. Connect o with e, making it equal in length to o e of the plan, Fig. 60; also connect g with h, making it equal in length to the plan level tangent h g.

The line o e will be the minor axis, and by drawing a line from o to h square to the minor axis we shall have the major axis, as shown from o to h. The angle between the tangents is shown at g. It will be observed that the process so far is similar to the process described in Fig. 60 to develop the section.

The joints of the face mold are to be made square to the tangents, that at h to the tangent g h and at c square to the tangent g c.

It is now required to know the width of the face mold at each end, it being understood that the width upon the minor axis will be that of the plan rail. To find the width at the end c we measure from c to m and from c to n, the distance m n shown upon the long edge of the bevel in diagram D of Fig. 60. To find the width of the end h we place on each side of h, as shown at h z and h x, a length equal to z z, shown on the upper bevel in diagram D of Fig. 60.

These two bevels are to be applied to the wreath material after it is cut square to the face of the plank in

On the plan, Fig. 60, it is shown that the wreath is to cover the distance from c to h, and that the plan tangent h g is a level tangent.

Owing to this condition the wreath after it is squared will be level at the point h and will, therefore, butt plumb and square to the remaining level portion of the scroll. This part of the scroll is shown in Fig. 63, and when in position above the curtail step it will be level from the point h all around.

It will be observed that the wreath under consideration differs from all preceding examples. Note that the pitch of the inclined tangent c' g', shown in the elevation of Fig. 60, is much steeper than the pitch of the straight rail of the flight; also notice how the easement in the straight rail is constructed to align with the pitch of the tangent c' g', and that this operation is necessary to guarantee a true square butt joint at c', or rather 4, between the rail of the flight and the wreath at the end c'.

Another difference between this wreath and those

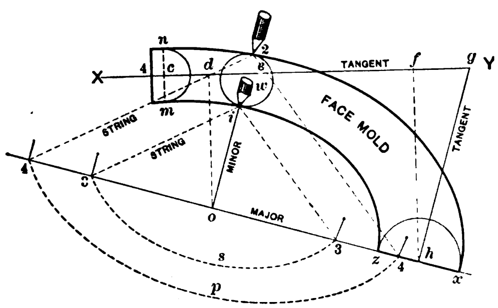


Fig. 61.—Face Mold for the Wreath Shown in Fig. 60.

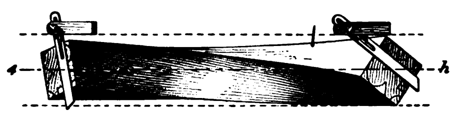


Fig. 62.—The Wreath After It Is Squared, Showing Application of the Bevels, Also that the Wreath Is Kept in the Center of the Plank.

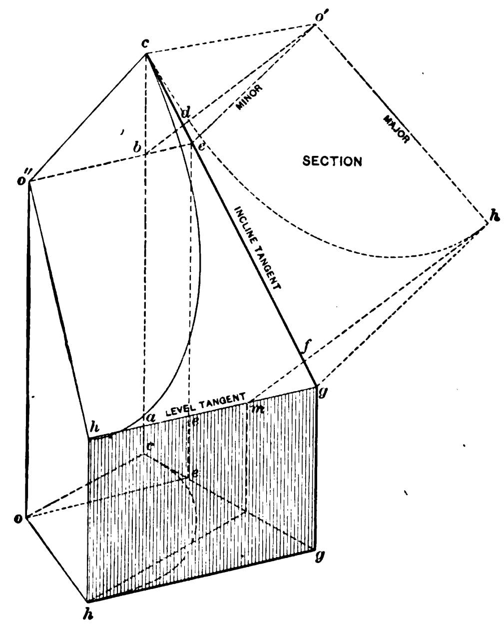


Fig. 64.—A View of Fig. 60 Folded in a Solid Block, Showing Graphically the Method of Developing a Section Cut Oblique to One Side and Its Application to Handrailing.

Some Problems in Stairbuilding.—IX.

the manner shown at each end in Fig. 62, to give the wreath the correct twist while winding around the curve of its plan in an oblique plane over and above it.

To find the points on the major axis to fix the pins to draw the elliptical curves of the face mold, take the distance o z of the major axis, Fig. 61, on the dividers, and with the point i on the minor axis as a center describe the arc s, shown by the dotted line, cutting the major axis in the points 3 and 3. Fix pins in these points, tie a piece of string to each and extend it to the point i on the minor axis. Place a pencil at this point and sweep the inside curve from m to z.

Again take the distance o x of the major axis in the dividers, and with point 2 on the minor axis as a center describe the arc p, cutting the major axis in the points 4 and 4. Place pins in these points. Tie a string to each pin extend to the point 2 on the minor axis, and then with a pencil sweep the outside curve, as shown from n to x.

The distance from c to 4 at the end c of the mold is made equal to c' 4 of Fig. 60 to join the easement of the straight rail of the flight.

The face mold is now complete, as shown in Fig. 61, and is ready to be used as a template to cut out of the plank square to its face the material for the wreath.

preceding is the length of its plan curve, which is shown in Fig. 60, from c to h to be more than a quarter turn. This greater length of curve causes the plan tangents c g and g h to be at an acute angle to one another, as shown at g, instead of at a right angle, as in all the other examples.

It will be found of great benefit to those who wish to master the art of hand railing to carefully study the methods exemplified in Figs. 36 to 41, inclusive, as they embrace the fundamental principles of every tangent system of hand railing, and once understood will be the means of overcoming all problems of construction that may arise in practice where the tangents on the plan are at right angles to one another, or, in other words, where the plan curve is a quadrant of a circle. In Fig. 60 it is further shown how to develop a section cut oblique to one side of a block, the base of which is not square, but of an irregular shape, as shown from o to c, from c to g, from g to h and from h to o. The method shown to develop the section, if compared with those demonstrated in Figs. 36 to 41, inclusive, will be found to be the same, and in Fig. 60 it is shown to be applicable in the development of the tangents of a face mold for a wreath to stand over and above a curve greater than a quarter turn.

To enable the reader to thoroughly understand the meaning of all the lines shown in Fig. 60 a view of it has been prepared. Fig. 64, representing an irregular shaped block cut obliquely to one side, as indicated from *c* to *g*, and level to another side, as shown from *g* to *h*.

Compare this figure with Fig. 60; trace upon it every point and line to correspond to those bearing the same reference letters in Fig. 60, and all the past supposed mystery attending wreath construction will be eliminated, resolving itself, as in the figures shown, to the very simple solution of developing an oblique section cut through a solid block.

The bevels shown in Fig. 60 at *z* and *m* and in Fig. 62 applied to the ends of the wreaths are found as follows: Commence by drawing a line from *o'* upon the section, Fig. 60, square to the inclined tangent *c' g'* to *b*. Now draw diagram D, as shown, making the base *o c* equal to *o c* of the plan, Fig. 60; make *c m* equal to *b d'* of the elevation, Fig. 60, and *c z* equal to *b a* of the elevation in the same figure. Connect *z* with *o* and *m* with *o*, thus determining the bevels, as shown at *z* and *m*, as stated. The bevel *m* is to be applied to the end *c'* of the wreath because its altitude is measured from *b* to the tangent *g' c'* and because the altitude of bevel *z* is measured from *b* to *a*, which is a point upon the level tangent *g' h'* continued. It indicates that this bevel is to be applied to the end *h* of the wreath.

The bevels in all cases are to be applied to the tangents from which their respective altitudes are measured.

A House in a Tree Stump.

In the northern section of Seattle may be seen one of the strangest houses, to be occupied by a family of seven children and their parents, that can be found in a thickly settled community. John Seivert recently went from Iowa to Seattle with a large family and a little money. On account of the demand for houses he was unable to rent a house suitable for his needs, and bought a lot in a section of the city from which the timber had been cut. He found half of the lot was taken up by a gigantic cedar stump measuring 30 ft. high, 18 ft. in diameter and 10 ft. above the ground.

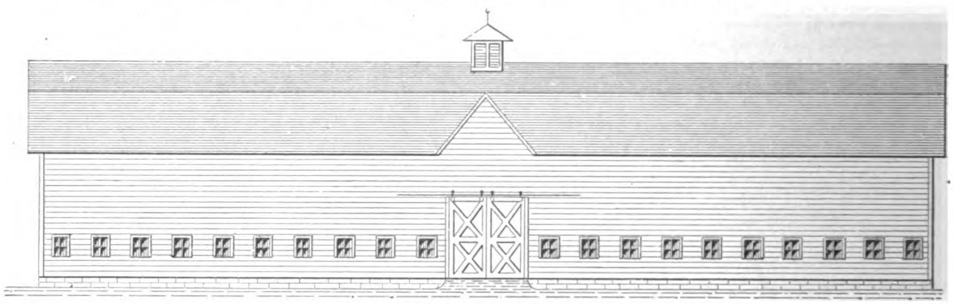
With an augur and saw Seivert cut out a 7-ft. section from the south end and walked into his stump. The walls were found to be 15 in. thick and the whole stump was a hollow shell. He cut windows, laid a tight floor and made a ceiling of planking and flooring.

With a ladder he cut another door 12 ft. above ground, went inside and made the windows for the second story. The third story was constructed and a tight roof of sniplap and shingles was made over the top.

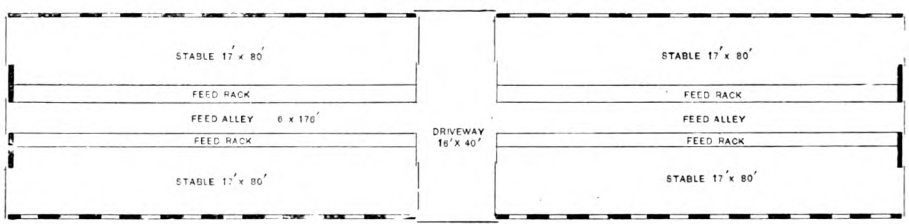
Seivert peeled off the bark and painted the stump a light green and the window and door frames pure white. The whole makes a very pretty home at a cost of only $40, and the owner has refused $2500 for his unique abode.

A Virginia Cattle Barn.

A barn which is designed especially for the wintering of fattening cattle in the comparatively mild climate of Virginia, where the winters though short are occasionally severe, is shown in plan and elevation herewith. The structure is 40 ft. wide and 176 ft. in length, with an 8-ft. basement and a 16-ft. superstructure topped with a curb roof. It is provided with four large stables, where the cattle are permitted to run loose, and on fair days the doors are left open, so that the cattle may have the liberty of large yards. The stables are so arranged that the manure spreaders may be driven from end to end of the barn, and, if desired, litter carriers may be introduced to advantage.



Front Elevation.



Main Floor Plan.

A Virginia Cattle Barn.—Scale, 1-32 In. to the Foot.

The second floor is fitted up with grain bins to be filled with the aid of power lifts, while the remaining space is to be devoted to the storage of hay, &c. The arrangement is such that the hay may be unloaded from the cross driveway running through the center of the barn or from either end by means of hay slings and power lifts.

The barn here described was built for J. E. Lemmon at Rectortown, Va., and is located on a fine plantation on which Mr. Lemmon has been meeting with much success in the fattening of beef cattle for export.

One of the new commercial buildings which will contribute to the structural transformation now going on between Seventeenth and Thirty-fourth streets, on Fourth avenue, Manhattan, New York, is the Milbank Building, which is about to replace the present four-story dwellings at the southwest corner of the avenue and Twenty-fifth street. It will cover a plot practically 99 x 125 ft. in area, will be 18 stories in hight and will cost approximately $700,000. According to the plans of the architects, George B. Post & Sons, it will be a loft building, with exterior walls of limestone ashlar, while internally special attention will be given to the requirements of the factory laws. It is expectd to have the new building ready for occupancy by the first of May, the coming year.

WHAT BUILDERS ARE DOING.

IN contrast with the record for the month of May, in the city of Atlanta, Ga., that for June shows a falling off in the value of the buildings for which permits were issued when compared with the corresponding month of last year. While the decline is not marked or significant, yet it is a decline rather than an increase. According to the figures compiled in the office of Inspector of Buildings E. R. Hays 336 permits were issued last month for new buildings to cost $431,976. In June last year 309 permits were issued, covering building operations estimated to cost $464,393. It is interesting to note that June this year showed the smallest total of any month in the first half of 1909.

For the period from January 1 to June 30 there were 2302 permits issued for new buildings, additions, alterations, repairs, &c., calling for an estimated outlay of $3,036,111, while in the first half of last year 1956 permits were issued for new work to cost $2,796,724.

Buffalo, N. Y.

There has been a decided increase in the volume of building operations now in progress as compared with this season last year, a very large proportion of the work being the erection of dwelling houses, for which there is a growing demand on account of the steady growth of the city. Another factor which has perhaps influenced the increased volume of business over last year is the lower prices of the leading building materials. Last month there was issued from the office of Deputy Building Commissioner Henry Rumrill, Jr., 362 permits for building improvements to cost $1,063,000, while in June last year 290 permits were issued for building improvements to cost $600,000.

The record for the first half of the current year is interesting in showing a marked improvement over the first six months a year ago. The figures for the current period are 1749 permits for improvements to cost $4,396,000, while the figures for the first half of last year are 1338 permits for improvements to cost $2,810,000.

Chicago, Ill.

New building construction is going on at a remarkable rate, all past records having been eclipsed in the extent of building as represented in the permits taken out in the city of Chicago during the first six months of this year. In point of cost the highest figures shown in any like period in the past 15 years was $36,489,145 in 1906, this being about $14,000,000 short of a new high mark. In the six months just closed permits have been issued for 6085 buildings having a frontage of 165,268 ft. and costing $50,460,930, as against 5353 buildings, 138,780 ft. frontage and costing $29,558,275 in 1908.

With the exception of May, when the figures ran up to something over $12,500,000, the month of June produced the largest total of the present year. Permits issued in June included 1198 buildings, with 29,284 ft. frontage, costing $8,271,050. This compares with 1108 buildings, with 27,103 ft. frontage and costing $6,561,225, in June, 1908.

Plans are being made for quite a number of buildings of important size, upon a number of which construction work will probably be begun during the present year. All arrangements, it is understood, have been made for the building of the new Sherman House and it is expected that bids will soon be taken for the fabricated steel required in this structure. The demolition of the old Sherman House, which occupies the site of the new building, will precede the actual work of construction.

The building trades are at present undisturbed by labor troubles of any moment, and it is believed that those responsible for what appeared to be unwarranted exercise of authority resulting in loss to both employer and employee will, in view of recent developments, be less active in the future in promoting such trouble.

Cincinnati, Ohio.

Building operations in the city, which were restricted somewhat during the first six months of the year because of threatened radical changes in the new code, have, since that instrument was passed, taken a healthy turn, and Building Inspector Kuhlmann is confident that the year will round out one of the best in the history of the city.

The figures available show a million dollars' worth of structures in excess of the same period of 1908. Just now theaters and places of amusement are taking the lead in the Queen City, four such buildings of important size being in process of construction at the present time, not to mention innumerable smaller structures under way and being remodeled for the 5-cent picture shows. School buildings furnished the larger share of activities of 1908's first half and, next to the theater structures, they did also for the last six months. The new $500,000 Woodward High School Building is one of these. The permit for the $500,000 Ohio Mechanics' Institute home will be issued during July. Apartment houses are also a factor in the list, a number of very costly ones being under construction.

The following table shows the record for the first six months of this year, contrasted with the same period a year ago:

	1909. Permits.	1909. Cost.		1908. Permits.	1908. Cost.
January	366	$297,780	January	189	$90,690
February	485	476,450	February	164	407,020
March	704	914,675	March	599	428,340
April	753	965,765	April	618	621,943
May	671	807,260	May	606	425,530
June	832	481,665	June	653	896,125
Total		$3,943,595	Total		$2,869,648

Architects are looking forward to a healthy building movement during the remainder of the year. Compared with the first half of 1908, the cost of materials entering into construction the first six months of 1909 was, on an average, 15 per cent. cheaper in this market. The tendency is still lower. A new Masonic Home for Linwood, Cincinnati suburb, a branch exchange for the Bell Telephone Company, a new manufacturing building for the Crane & Breed Company, are some of the projected structures, the aggregate cost of which will be from $150,000 to $200,000.

Cleveland, Ohio

During the first six months of 1909 there were issued by the building inspector's office in this city 3707 building permits of structures to cost $6,667,014. This is an increase of over 60 per cent. as compared with the same period of 1908, when 3292 permits were issued for buildings to cost $4,080,079. In the same period of 1906, which holds the record in local building activities, permits were issued for buildings to cost $7,374,977.

During June there were 633 permits issued for buildings to cost $1,349,004, the value being more than double that of the 543 permits in June, 1908, which called for an estimated outlay of $692,562.

Permits for the erection of 1313 frame buildings were issued during the first six months of this year and 346 permits for brick and stone buildings.

The building outlook for the balance of the year is very satisfactory. Work has only just been started on several large mercantile and office buildings, on which construction will be pushed during the balance of the season. In addition a good volume of smaller work in the way of small business blocks, terraces and dwelling houses continues to come up. The price of some lines of building material has been advanced during the past few weeks, but this advance is not affecting building operations.

Denver, Colo.

The unsettled conditions growing out of the labor disturbances in the building industry are reflected in the volume of operations for last month, when 309 permits were issued for improvements estimated to cost $853,385, while in the same month last year there was issued from the office of Inspector R. Willison of the Building Department 329 permits for buildings to cost $1,340,105.

The preponderance of dwellings thus far the present year is indicated in the excess of permits granted as compared with last year, the totals of valuation remaining practically the same. According to the statistics at hand there were 1811 permits issued in the first six months of 1909, calling for an outlay of $5,385,808, while in the same period last year 1581 permits were issued for improvements costing $5,194,360.

Des Moines, Iowa.

The building situation partakes of a "veritable boom" as contrasted with this season last year, and dwelling houses and business buildings are going up on all sides. An idea of the extent to which new work has been projected may be gained from the figures compiled in the office of the Superintendent of Public Improvements, which show that in June 71 permits were issued for buildings to cost $259,782, while in the same month last year 38 permits were issued for improvements to cost $68,475, and in June, 1907, there were 39 permits, involving an outlay of $61,175.

Less striking but none the less emphatic is the showing for the first half of this compared with last year. There were 309 permits issued for the period from January 1 to June 30, inclusive, calling for an expenditure of $1,042,347, which figures contrast with 233 permits and a valuation of $490,375 in the same period in 1908, and 296 permits, involving an outlay of $590,869, in the first six months of 1907.

Hartford, Conn.

Present indications point to a much larger volume of business in the building line than was the case a year ago.

an important factor being the natural growth and development of the city as evidenced by the large expenditure for dwelling houses. Just what this proportion is may be gained from the statement that out of a total of 424 permits issued the first six months of the current year for improvements to cost $1,668,240 there were 161 permits issued for dwelling houses estimated to cost $1,125,600. In the first half of last year 317 permits were issued from the office of Building Inspector Fred J. Bliss for improvements involving an estimated outlay of $913,885.

Indianapolis, Ind.

While the number of permits issued last month from the office of Inspector of Buildings Thomas A. Winterrowd was less than for June last year, the value of the projected improvements was very much greater, thus showing that current operations are of a more pretentious character than at this season a year ago. The figures at hand show that in June 382 permits were issued for building improvements to cost $709,537, whereas in the same month last year 396 permits were taken out for new work valued at $494,731.

For the first six months of the current year there were 2073 permits issued for building operations involving an estimated outlay of $3,468,569, while in the corresponding period of last year 2012 permits were issued from the office of the inspector of buildings for new work calling for an outlay of $3,041,913.

Prices of building materials remain about the same as last year, so that the increase in operations and capital invested must be attributed to the natural growth and development of the city. The larger proportion of the structures now being erected are intended for business purposes.

Los Angeles, Cal.

The building record of this city for the month of June showed a total of 715 permits, with an estimated valuation of $1,148,418, were issued, and in May 623 permits, with a total valuation of $1,006,764, were issued. As compared with last year, the record for the month just closed shows a gain of more than a quarter of a million dollars, and as compared with 1907 a loss of half a million dollars. During the last month only one class A building, to cost $27,548, was started, while there were 30 class C buildings, to cost $320,726, and 263 one-story frame buildings, to cost $286,170; 19 one and one-half story frame buildings, to cost $39,685, and 36 two-story frame buildings, to cost $196,830.

The feature of the month was the absence of the better class of brick buildings included under classes A and B and the increase in the construction of cheaper brick buildings included under class C. The increase in class C construction is ascribed to the demand for business structures in the outlying sections, where land values are not great enough to justify expensive construction, though the fire limits necessitate the use of fireproof walls.

Notwithstanding the fact that building has shown but little increase for the last two months, there is a general feeling that the situation is strong and that the outlook is good. The fact that the demand for new residences keeps up and that money is freely loaned for this class of structures is considered evidence that the city is far from overbuilt.

The labor market continues favorable for building. Wages are tending lower rather than higher. Materials are also cheap, though lumber is reported to be held a little firmer at wholesale.

Louisville, Ky.

Here, as in other cities of the country, a large percentage of the new work in the building line consists of dwelling houses to meet the demands of a growing population. There are comparatively few structures for business purposes in course of erection, but there is enough work in other lines to keep mechanics in the building industry fairly well employed. The tabulated figures covering building operations for June, compiled in the office of Inspector of Building Marshall Morris, show 256 permits to have been issued for building improvements estimated to cost $384,234, whereas in the same month last year 277 permits were issued for improvements involving an estimated outlay of $198,178.

For the six months of the current year there were 1591 permits issued, calling for an outlay of $1,492,365, these figures contrasting with 1519 permits for new work to cost $1,256,854 in the first six months of 1908.

Memphis, Tenn.

The building improvements which are under way are of a general character, involving many dwellings as well as a number of structures for business purposes. As compared with a year ago the cost of building materials is much the same, although lumber in the last week or two has shown a tendency to advance. The city is certainly improving in the building line and those competent to judge of the situation are looking forward to a very successful year in this respect.

According to Building Commissioner Dan. C. Newton there were 1243 permits issued from January 1 to June 30, inclusive, of the current year, calling for an estimated outlay of $1,845,066, while in the corresponding period of last year 1254 permits were issued for building improvements valued at $1,620,555.

Milwaukee, Wis.

There has been a slight increase in the amount of new building as compared with last year at this season, although the gain is not as marked as it has been in times previous. During June Chief Inspector of Buildings Edward V. Koch issued 492 permits for improvements estimated to cost $1,519,355, whereas in June last year 468 permits were issued for improvements valued at $1,250,442.

For the first six months of the current year the amounts differ somewhat radically. The first half of this year shows that 2243 permits were issued for new buildings, alterations and repairs to cost $5,805,012, whereas in the corresponding period of 1908 there were 2157 permits taken out for new work involving an estimated outlay of $4,165,521. It is interesting to note that of the amounts involved in building operations during the current year approximately 60 per cent. was for structures designed for business purposes, while 40 per cent. was for dwellings.

The prices of building materials this year vary little from those of a year ago, thus indicating that the increase in building operations is the result of the prosperous condition and natural growth and development of the city.

Minneapolis, Minn.

The total value of the building improvements for which permits were issued from the office of Building Inspector James G. Houghton broke all records for June for the past 20 years, the figures embracing 695 permits, calling for an estimated outlay of $2,338,515. This record was exceeded only once, and that in December, 1888, when the estimated value of the new improvements was $3,595,716. This large total was due to the permits for the City and County Building and the Guaranty Loan Building, which accounted for $3,250,000. In referring to the situation, Inspector Houghton states that he has never known so much building as is going on at the present time, and one of the significant things is that fully two-thirds of the permits issued are for new homes.

For the first six months of the current year 3117 permits were taken out for new buildings, alterations, additions, &c., calling for an estimated outlay of $6,705,340, while in the corresponding period of last year 2837 permits were issued involving an estimated outlay of $4,368,325.

The great increase in building operations appears to be due to the growth and development of the city, which has been very rapid and apparently of a healthy nature.

Newark, N. J.

The work which is now in progress in the city is of a much more pretentious nature than was the case at this season last year, and is due to the fact that several important commercial buildings have been projected. While the number of permits issued in June by the Department of Buildings, of which William P. O'Rourke is superintendent, is only slightly in excess of that for June last year, the estimated cost of the projected improvements shows a marked increase due to the cause above mentioned. According to the figures of the department 238 permits were issued last month for new work estimated to cost $1,148,614, while in June last year 221 permits were taken out for improvements involving an estimated outlay of $751,208.

During the first half of the current year the department issued 1386 permits for building improvements costing approximately $8,701,623, while during the same period in 1908 the department issued 1114 permits, calling for an estimated outlay of $3,235,899.

The permits granted during the first six months of the current year covered 1160 frame buildings, 326 brick buildings, 39 concrete structures, 3 reinforced concrete structures, 2 stone buildings, 28 iron and steel buildings and 3 terra cotta buildings, making a total of 1561 structures. Of this total 549 were frame dwellings and 71 were brick dwellings. There were 58 storage buildings, 117 store and office buildings, 83 garages, 81 factories, 1 concrete dwelling house, 6 public schools, 7 churches, 3 theaters and 140 stables and sheds.

Oakland, Cal.

During June the building permits issued in this city reached a total of 263, with a valuation of $567,352, the highest record of recent months. For the past four or five months the valuation of the building operations has shown a gradual rise, the showing for May being $528,183, for April $507,120 and for March $445,000. The good showing made in June will, it is believed, be improved on as the season advances, as the vacation season is now at its hight. The present work is almost entirely concerned with the construction of residences, and the tendency in this direction will be much greater within the next few months owing to improvements in the ferry service with San Francisco, which will place the business center of that city within as close touch with the residence sections of this place and its adjoining towns as are the residence quarters of San Francisco itself.

Omaha, Neb.

A striking feature of the present building situation is the extent to which dwelling houses are being erected, these constituting a very large percentage of the total. This, however, has been the case for a number of years past, but more large buildings will probably be constructed this year than for the past 20 years. Prices of building materials remain about the same as last year, although it is felt that the present demand for such articles as brick may cause a slight advance in price. The increase which has taken place in building operations is due entirely to the rapid and substantial growth of the city, and is also something that is necessary for the very crowded condition of the business center.

During the month of June there were issued from the office of Building Inspector C. H. Withnell 155 permits for building improvements to cost $562,280, while in the same month last year 132 permits were taken out for new work to cost $450,160.

The record for the first six months of the current year, when 858 permits were issued for new buildings involving an estimated outlay of $3,543,860, is far ahead of that of the corresponding period of last year, when 732 permits were issued for new work valued at $1,738,450.

Philadelphia, Pa.

A particularly strong position, as far as the local building trade is concerned, is to be noted from the statistics showing the volume of business undertaken during the first six months of the current year. From the records of the Bureau of Building Inspection it is shown that expenditures have been authorized amounting to $21,894,755, as compared to $13,767,510 during the same period last year, and but $880,520 less than that for the same period in 1907, during which the activity in building operations was still quite pronounced.

By far the greater activity has been in dwelling house operations, the records showing a total authorized expenditure of $9,375,815 for 4908 two-story dwellings and $3,139,070 for 660 three-story dwellings, the total $12,514,885, compared with that expended for the same class of work during 1907, shows a gain of nearly 50 per cent. during the past six months. Manufactories, worshops and warehouses also show a substantial gain over the same period last year; in fact, in hardly any class of work has a decline been shown. Should building operations continue on approximately the same basis during the second half of the year, and it is confidently predicted that they will, we will be able to at least equal, if not exceed, the total during 1906, the banner year in the local building trades, when work, aggregating over $40,000,000, was undertaken. The outlook in this connection is believed to be exceedingly bright, owing to the fact that a number of large buildings will be erected in the central section of the city, the cost of which will alone reach some $4,000,000 to $5,000,00.

The volume of work begun during the month of June, taken individually, showed a slight decline when compared to the preceding month. Permits were issued by the bureau for 1609 operations, the estimated cost of which aggregated $4,156,690, a falling off of about $800,000, of which $100,000 represented the decline in two-story dwelling work, while $400,000 represents the decrease in three-story dwelling operations. Compared with the volume of business done during the month of June in other years, it is seen that the past month held the high record in all but two years, 1904 and 1905, years in which dwelling operations were exceedingly heavy. The situation as far as the building trades is concerned is generally satisfactory.

An event of interest to the trade during the month was the annual baseball game between teams representing the Builders' and the Lumbermen's exchanges, which was played at the Pennsylvania Railroad Young Men's Christian Association grounds, June 24. For the first time in several years, during which these annual games have been played the Lumbermen succeeded in winning from the Builders, the score being 11 to 4, in favor of the former. The proceeds of the game were divided between several charitable organizations.

Pittsburgh, Pa.

Building operations in the city last month were covered by 440 permits and called for an estimated outlay of $2,300,098, of which 228 permits were for new buildings having a total value of $2,074,105. Permits were also granted for 50 additions and 162 alterations and repairs. Of the new buildings 90 were brick, 52 frame, 82 brick veneer and three stone and one steel. In June last year the total value of the improvements for which 375 permits were issued was $938,149.

For the first six months of the current year there was a total of 2031 building permits issued, representing structures to cost in the aggregate $9,391,521, which is an increase over the corresponding period of last year of 189 permits and $3,849,994 in valuation. Included in this year's total is the 25-story H. W. Oliver office building, which will cost $2,500,000. During the next six months it is expected permits will be issued for several costly structures, so that the total for the 12 months will closely approximate $20,000,000.

Portland, Ore.

The population of the city is increasing very rapidly at the present time and this is being reflected in a remarkable increase in building activity. The price of building materials and labor is back to approximately the same figure at which it stood two years ago before the financial depression and the cost of materials does not seem to have influenced the situation very much either one way or the other.

The report of G. E. Dobson, building inspector of the city, shows that there were 400 permits issued in June for building improvements to cost $865,300, while in June, last year, there were 385 permits issued for improvements costing $841,065. The record for last month is much below that for May, when the total value of the improvements projected was $1,142,400, this in turn showing a falling off from the April figures, which were $1,651,195.

For the first six months of the current year there were 2237 permits issued for building improvements to cost $6,305,335, these figures contrasting with 2590 permits in the first half of last year for building improvements valued at $4,887,610, a net increase of about 30 per cent. By far the larger portion of this was for dwelling houses.

Richmond, Va.

After the necessary preliminary steps had been taken by those prominently interested in the movement, the permanent organization of the Builders' Exchange of the city of Richmond was effected on May 25, and the following officers were elected to serve until June, 1910:

President..............W. A. Chesterman.
First Vice-President.....C. K. Bryant.
Second Vice-President...W. J. Gilman.
Third Vice-President....Rueben Burton.
Secretary..............W. Douglas Gordon.

The Board of Governors is composed of C. Manning, Jr., W. J. Gilman, I. J. Smith, W. B. Davis, W. C. Davis, J. L. Phippen, Ralph Binswanger, C. W. Montgomery, O. B. Slaughter, W. J. Whitehurst, C. K. Bryant, Rueben Burton and W. L. Ragland.

The following committees were elected to serve the term of 1909-1910:

Membership Committee.—Charles Rose, chairman; A. M. Walkup, W. B. Davis, W. H. Jenks, I. J. Smith, C. W. Montgomery, J. L. Phippen, R. C. Beverley and David Simpson.

Finance Committee.—W. H. Sherwin, chairman; Harry Binswanger and Charles R. Winston.

Legislation Committee.—W. J. Gilman, chairman; J. E. Phillips, Jr., and R. H. Meade.

Manufactures.—H. S. Winston, chairman; J. F. Addison, W. B. Lathrop, J. L. Lindsay and John A. McCloy.

Arbitration Committee.—S. H. Hawes, chairman; W. J. Parrish, J. Graham Davidson and W. Creed Davis.

Architects' Plans and Contracts.—W. H. Campbell, chairman; W. F. Mahoney, W. J. Ready, C. E. McGowan and Rueben Burton.

Executive Committee.—C. Manning, Jr., chairman; W. L. Ragland and W. J. Whitehurst.

The exchange has started out under most favorable conditions, and its membership roll shows the names of fully 100 of the leading architects, contractors, subcontractors and material men of the city. There is every indication at the present time that the organization will be a live one among the leaders of the movement.

Several notable building enterprises arranged last month brings the total estimated outlay for the 98 permits issued to $605,510, while the 127 permits issued in June last year called for an outlay of only $246,707.

Rochester, N. Y.

Building operations are going ahead with a rush and for June are more than double the valuation they were at this season last year. The number of permits is also more than double, the increase being due in large measure to the fact that the greater proportion of the improvements for which permits are being issued are for dwelling houses.

The report of Fire Marshal H. W. Pierce shows 325 permits to have been issued last month for buildings to cost $1,061,268, while in June last year 159 permits were issued for buildings to cost $486,553.

Taking the figures for the first six months of the current year, it is seen that 1451 permits were issued by the department, calling for an estimated outlay of $4,418,794, while in the first six months of last year 753 permits were issued for building improvements valued at $2,131,133.

Sacramento, Cal.

The building record of this city for June reached a total of $359,529, a figure which is far above that of any month prior to the present year and well above the average even of this year, which is certain to break all previous records. For the first six months of the present year the total amount of building work undertaken was $1,361,721, or only a few thousand dollars below the total for the entire 12 months of

1908. Local builders claim that in proportion to its size Sacramento is showing a larger growth than any other city on the Coast.

San Francisco, Cal.

The activity in building continues to increase, though the improvement is not so large nor so rapid as had been anticipated earlier in the season. The total value of the building permits issued during June was $2,853,173, a gain off about $200,000 over the month preceding and well above the average for the first six months of the year. The permits issued in June also make a good showing as compared with those issued in the same month last year, when the total was only $2,351,211. For the six months ending June 30 the total for the present year was $15,957,000, as compared with about $12,000,000 for the same months last year.

A number of large buildings, which were in plan early in the year, are still being held up, notwithstanding the favorable weather and the comparative ease of the money market. Money is being loaned quite freely for building purposes, but land owners seem to be holding off for a settling of business conditions, which are rather quiet.

Building materials in the San Francisco Bay section continue about as before, though a firmer tendency is manifested at primary sources of supply. Lumber is still quoted at the old figures here, but cannot be had at the Northern mills for less than $1 more than a month ago. Ordinary fir is now held at $11.50, at the mills, though little has yet been sold at the advance. Redwood lumber is still low in price, with abundant stocks on hand here and at the mills. The brick market has been demoralized, and common brick have been selling down to $7 per 1000, owing to a threatened disruption of the manufacturers' organization. Just now the manufacturers seem to have settled their differences, and today brick is again quoted at $9. Other materials are unchanged.

One notable feature of the larger buildings of the present summer is the architectural terra cotta that is being used. The reaction against terra cotta for cornices and for ornamental fronts generally, which seemed to prevail after the great fire, has about disappeared, and terra cotta has again largely displaced sheet metal for this class of work.

Seattle, Wash.

Steady progress continues to be made in the growth of the city and building operations show a notable increase as compared with this season last year. Many frame dwellings are being erected, although brick and reinforced concrete work are by no means neglected. The report of F. W. Grant, Superintendent of Buildings, for the month of June, shows 1357 permits to have been issued for building improvements estimated to cost $1,656,425, while in June last year 939 permits were taken out for buildings to cost $1,004,312.

Of the total last month, 260 permits were for frame dwellings to cost $488,995, and there were also permits taken out for 508 frame structures to be used for business purposes. There were five permits for brick buildings to cost $215,000, and one for a fireproof steel frame building to cost $400,000.

For the first six months of the current year the department issued 7899 permits for new work, to cost $11,104,655, while in the first half of last year the building improvements for which permits were issued were valued at $5,109,319.

Spokane, Wash.

While the volume of new work designed in June was a trifle less than for May and considerably below the figures for either April or March, it is somewhat better than at this season last year, and is of a much more costly character. The report of Building Inspector George Mackie shows that 261 permits were issued in June, calling for an outlay of $701,170, and that in June last year 322 permits were issued for new work to cost $504,203.

For the six months of this year 1758 permits were taken out for building improvements to cost $4,567,420, whereas in the corresponding period of 1908 there were 1625 permits issued calling for an estimated outlay of $3,032,280.

St. Paul, Minn.

There was fully double the amount of new work projected last month than there was in June a year ago, and the outlook is bright for a good season's business. The 531 permits issued in June covered a large number of dwellings of various kinds, and these with other structures, additions, alterations and repairs called for an estimated outlay of $1,709,198. In the same month last year the total value of the buildings for which permits were issued was $807,542.

For the first six months of this year the total value of the new work projected was $5,604,697, as against $2,975,139 in the corresponding period of last year.

St. Louis, Mo.

Although the volume of building operations last month fell somewhat below the June record of a year ago, yet a gratifying degree of activity prevails in all branches, and the outlook is for an average year in this department of industry. As shown by Building Commissioner James A. Smith's report the value of the building improvements for which 906 permits were issued in June was $1,901,254, while in June last year the total was $1,942,736 for 841 permits. The principal item in last month's report was new brick buildings, which numbered 251, estimated to cost $1,598,813, these figures contrasting with 279 brick buildings, to cost $1,727,565 in the same month a year ago. Alterations to brick buildings were more than ordinarily a factor in the total, the number being 175, involving an outlay of $194,788, against 135, costing $115,078 last year.

For the six months of the current year there were 5016 permits issued for new work, valued at $13,374,217, and in the first half of last year there were 4568 permits issued for work estimated to cost $10,477,121.

It is interesting to note that prices of leading building materials are about 10 per cent. lower than last season and that the bulk of the permits issued this year are for dwelling houses.

Toledo, Ohio.

A considerable proportion of the volume of building operations in progress at the present time is made up of dwelling houses, although there is to be noted a general but not large increase in commercial buildings. Prices of materials have gained just about what they lost last year, and are holding firm. They have not, therefore, been an important factor in influencing the building situation. During June 133 permits were issued from the office of the Department of Building Inspection for building improvements having an estimated valuation of $244,088, while in June last year 107 permits were issued for improvements valued at $186,260.

There were 642 permits issued the first six months of the current year for improvements, having an estimated valuation of $1,894,989, whereas in the same period last year 486 permits were issued for new work, having an estimated value of $870,362.

Washington, D. C.

There is at the present time quite a volume of business in the building line, the greater proportion of the permits issued being for dwelling houses rather than for business structures. Prices of building materials are much the same as a year ago, and therefore the increased volume of operations is due to the natural growth of the district. Last month there was a marked increase in the value of the work projected not only as compared with the previous months of the year, but also with the corresponding month of last year.

According to Inspector of Buildings Morris Hacker there were 721 permits issued in June for new buildings to cost $2,236,658, while in June last year 536 permits were issued for improvements, involving an estimated outlay of $1,203,883.

For the six months of the current year there were 3318 permits issued for building improvements, involving an estimated outlay of $8,557,272. In the corresponding period of last year 2584 permits were issued for new work, estimated to cost $5,225,562.

The Builders' Exchange Exhibit Company is the name of the concern which has recently been incorporated under the laws of Virginia, the object of which is to establish a permanent exhibit of builders' materials in the national capital. For a long time the manufacturers of and dealers in building materials have felt the need for a central point where samples of new appliances, inventions and other incidentals in connection with construction work might be assembled and inspected, and with the incorporation of the company named operations have been commenced upon a building in H street, between Thirteenth and Fourteenth streets, N. W., which will be known as the Builders' Exchange Building. It will be the headquarters of the Master Builders' Association, the Employers' Association of the Building Trades and all allied trades in the building industry, such as plasterers, electrical workers, plumbers, painters, carpenters and others.

It will also afford quarters for the Builders' Exchange Exhibit Company referred to above, the purpose of which is to conduct a business for selling or renting of space for the exhibition and advertising of patented devices, models, drawings, pictures, books, architectural works and all other kinds of property likely to be of interest to architects and builders.

The names of the officers of the new company are:

Treasurer.............. Samuel J. Prescott.
Vice-President.......... C. H. Rudolph.
Secretary.............. Edwin G. Graham.
President.............. L. P. West.

The new Builders' Exchange Building has a frontage of 95 ft., a depth of 140 ft., and will be two stories in hight when completed. It was designed by Speiden & Speiden, architects, and when finished it will present a combination of Spanish and Moorish architecture, more perhaps by suggestion than in the carrying out of actual details. The building was designed expressly for offices of the Builders' Exchange and for a spacious exhibition hall on the second floor.

LAW IN THE BUILDING TRADES.

BY A. L. H. STREET.

PUBLIC BUILDINGS NOT SUBJECT TO MECHANICS' LIEN.

A public school building, title to which is vested in a Board of Trustees, is not subject to a mechanic's lien for material furnished for its construction; the statute not showing an intention to extend the lien to public property. (Supreme Court of North Carolina.) Morgantown Hardware Company *vs.* Morgantown Graded School, 64 Southeastern Reporter, 764.

LIABILITY FOR INJURY TO EMPLOYEE.

An experienced carpenter was injured by reason of the collapse of a temporary scaffold constructed by himself and fellow carpenters in the erection of a sawmill in defendant's lumber yards. The scaffold was erected in compliance with directions from defendant's foreman out of certain hemlock pieces lying on the third floor of the building. The injured carpenter did not construct the part of the scaffold which broke and did not know of its defective condition. While the carpenters were ordered to utilize the material designated, there was other material in the yards that could have been used by merely asking the foreman to furnish it in case any of that designated was found unsuited for the purpose for which it was required. Held that the foreman's order only amounted to an order to use such part of the material as was suitable and nearest at hand, and that defendant was not negligent, and hence not liable for the injury. (United States Circuit Court of Appeals, Sixth Circuit.) Noble *vs.* C. Crane & Company, 169 Federal Reporter, 55.

CONTRACTOR'S LIABILITY FOR INJURY TO CHILDREN.

One who maintains a dangerous structure or appliance, whether on his own land or lawfully in a public highway, must exercise reasonable care to protect from injury, not only those of mature age, who are bound to use their faculties to protect themselves, but also children of tender years, who may without their fault become exposed to danger. Defendant, a contractor for the building of a structure in which heavy steel I-beams were used, piled the same on the sidewalk in front of the lot, which he had the right to do with the owner's consent. Plaintiff, who was 4½ years old, was accustomed to play with other small children in the street near such piles, and they frequently climbed or sat upon the same. In some manner one of the beams became crossed diagonally over the pile where it rested in an insecure position and, the evidence tended to show, had remained so for two or three days, when the children in playing caused it to fall, plaintiff being thereby injured. Held, that defendant, having had actual or constructive notice that children were in the habit of playing in the street and would naturally be attracted by the piles of beams, owed them the duty to pile and keep such beams in a reasonably secure manner to prevent their falling and injuring the children, and that his failure to do so was negligence, rendering him liable for the injury. The child could not by reason of her age be charged with contributory negligence or with being a trespasser. (United States Circuit Court of Appeals, Third Circuit.) Snare & Triest Company *vs.* Friedman, 169 Federal Reporter, 1.

SUITS ON BUILDING CONTRACTORS' BONDS.

Where in an action on a building contractors' bond plaintiff owner testified that he could have rented his old building from January 1, 1907, if he had obtained possession of the new building before that time, and it appeared that he had leased the old building for a term ending February 29, 1908, before the contract for the new building was entered into, the rental value of the old building was immaterial. One employing a contractor to erect a building is not entitled to damages for the loss of rental value of the new building while kept out of it by fault of the contractor or his surety, and also to liquidated damages therefor. The drawings and specifications annexed to a building contract are the only original and satisfactory proof of the drawings and specifications, and drawings prepared by the contractor after the execution of the contract, and submitted to the building inspector for approval, do not prove the character of the drawings annexed to the contract, in the absence of proof that they are duplicates thereof. The specifications for a building provided for the construction of one side of the building on reinforced concrete columns and girders "in place of wall," sufficient to add additional 15 ft. in width to present building; to have curtain wall of brick. The curtain wall was a 13-in. wall carrying no weight and designed only to close the side of the building, all the weight being carried on the columns and the girder taking the place of the wall. The drawings did not show any location for the girder. Held that the girder was designed to be flush with the wall. Where words and figures in a contract are inconsistent the words govern. A building contractor's bond stipulated that the surety should be notified of any act involving a loss for which the surety was responsible. A stairway called for in the contract was omitted at the request of the architect of the owner. The contractor was paid therefor. Notice of the omission or payment was not given to the surety. Held, that the surety was not discharged from liability, the omission of the stairway and the payment therefor not involving any loss to the surety. A building contract requiring the performance of the work to the satisfaction of the architects, and stipulating that in case the work is not completed within 70 working days the contractor shall pay the owner $50 for every day in excess of 70 occupied in the work, and in case of completion in less than 70 working days, the owner shall pay the contractor $50 for every day of the 70 days not occupied in the work, provides for liquidated damages for the contractor's failure to complete the work within the 70 working days. Where the building inspector required extra labor and material for reinforcement of a building and the specifications, declared to be a part of the contract for the construction of the building, made the requirements of the building inspector also a part of the contract, the owner was entitled to recover from the contractor's surety the reasonable cost of the extra labor and material. (Maryland Court of Appeals.) United Surety Company *vs.* Summers. Summers *vs.* United Surety Company, 72 Atlantic Rep. 775.

STRIKE AS EXCUSE FOR BREACH OF BUILDING CONTRACT.

In an action for refusing to allow plaintiff to complete a building contract, wherein plaintiff sought to excuse delay on the ground of a strike among workmen, defendant could show that an employers' association, which plaintiff joined after the commencement of the work under the contract and the beginning of a strike among the builders' employees, promulgated an order that members should not employ any more men than they were then employing, nor receive or deliver materials for any building, without authority from the association's Governing Board. The clause in a builder's contract making a strike among workmen a valid excuse for delay does not protect a contractor from the consequences of a voluntary lockout against employees on his part. (New York Supreme Court, Appellate Division.) Mahoney *vs.* Smith, 116 N. Y. Supp. 1091.

TIME FOR SUING ON CONTRACTORS' BONDS.

A building contractor's bond executed by a paid surety is to be treated as a contract of insurance and construed strictly against the surety, provided the language is susceptible of two interpretations. A bond providing that in no event should the surety be subject to any suit on the bond instituted later than a specified date was too plain to admit of construction, and hence the obligee was not excused for failure to sue within the time prescribed by the contractor's failure to complete the building within that time. A bond providing a contract limitation for suits thereon is not unreasonable or invalid because the time so limited expires before the contractor completes the building. (Illinois Supreme Court.) Lesher *vs.* United States Fidelity & Guaranty Company, 88 N. E. Rep. 208.

RIGHTS AGAINST THIRD PERSONS UNDER BUILDING CONTRACTS.

Where defendant knew that a contractor who was excavating on an adjoining lot was erecting supports to prevent injury to his building and lot by the giving way of the lateral support because of the weight of the building, which it was defendant's duty to do, and requested him to furnish labor and materials for that purpose, defendant was bound to pay the contractor therefor. That a 22-in. strip of soil intervened between a building and the adjoining lot did not require the land owner or his contractor to protect defendant's lot and building in making excavations. (Connecticut Supreme Court if Errors.) Ceffarelli *vs.* Landino, 72 Atl. Rep. 564.

BUILDING CONTRACTS—BONDS—DAMAGES.

Where refusal to accept a bond on a building contract was put solely on the ground that it had not been tendered in time, it was not error, in an action by the contractor for breach of contract, to reject the other party's offer to show the contractor's financial condition; and it was proper to refuse to consider the fact that the bond tendered was that of a foreign corporation. Where the other party to a contract was advised that the contractor had applied to a foreign corporation for a surety bond to meet the requirements of the contract and made no objection, while that fact may not have required it to accept such bond, yet, if it finally rejected for the reason that it was given by a foreign corporation, the contractor would be entitled to further time to procure another bond. The measure of a contractor's damage for breach of a building contract is the difference between the contract price and what the entire cost of the building would be to the contractor. (Pennsylvania Supreme Court) Shallenberger *vs.* Standard Sanitary Mfg. Company, 72 Atl. Rep. 500.

Staining and Finishing Hard Woods.

Answering a correspondent of that journal as to what class of hard woods require staining and filling, and what class is best finished in the natural and without filling; also the best kinds of filler to be used and the manner in which to do the work, a recent issue of *The Painters' Magazine* has the following:

The hard woods requiring filler comprise ash, oak, cherry, mahogany, walnut, rosewood, ebony, birch and redwood. Maple, sycamore and cypress are best filled with shellac varnish, while the open grained hard woods referred to above should be filled with mineral fillers, the so-called paste fillers offered to the trade by paint manufacturers. These fillers are offered in light shade or natural; also in oak color and dark or walnut, and in mahogany and ebony. Or the consumer may purchase the filler in the natural and color it to match the wood or the stain. Whenever the wood is to be enriched by staining or one wood is to be stained to imitate another, as in the case of birch to imitate mahogany or of cherry to imitate walnut, the filler must be colored to match the stain. When the wood has been prepared by scraping, sandpapering, &c., and dusted, and requires staining, this operation is always performed before filling, and if the work in hand is interior wood finishing oil stains are best for the work in point of durability. They make the best foundation for the filler and by using them thinned sufficiently with turps or benzine can be made to stain fairly deep and dry within reasonable time.

The stains being dry and hard, the paste filler is thinned with turpentine to the consistency of thin varnish and applied in the same manner with a short, heavy brush, crossed and recrossed, so that the grain and pores may be filled. The filler is allowed to set, but not permitted to become hard, then the surface is rubbed across the grain with tow, excelsior or shavings to remove the excess of filler and pack the pores. This done, the surface is rubbed over with a piece of soft cloth and from 24 to 48 hr. allowed for thorough drying. On very open grained wood a second coat of filler is often required for good work.

When the wood has been filled to the satisfaction of the operator, the surface should be smooth sandpapered and carefully dusted before applying the first coat of varnish. It has been suggested that a good job of hardwood finishing cannot be had without applying a coat of shellac varnish on top of the filler, but we do not favor this because with a fair grade of interior varnish shellacking is not required.

As to imitating walnut on cherry, the stain is best made from Vandyke brown and burnt umber ground in oil, thinned with turps and japan drier. To imitate mahogany on birch, the straight grained birch should be selected and stained with a mixture of burnt sienna, Vandyke brown and red lake for bright and burnt sienna, Vandyke brown and rose pink for dark mahogany effect.

Building in Canada.

The following table shows the building operations in 10 cities of Canada for June and for the first six months of this year, as compared with the corresponding periods of 1908, the figures being compiled by the *Contract Record* of Toronto:

	June.		Six months.	
	1909.	1908.	1909.	1908.
Toronto	$2,011,545	$1,055,405	$8,829,375	$5,013,245
Montreal	1,170,790	....	4,283,910	1,500,000
Winnipeg	2,041,650	802,200	5,462,450	2,238,250
Vancouver	682,270	333,400	3,418,195	3,354,050
Ottawa	1,384,975	235,500	2,607,665	875,225
Halifax	66,830	61,890	374,900	362,770
Fort William	307,125	158,175	....	....
Regina	121,650	75,310	362,645	156,183
Calgary	202,710	147,700	949,110	409,090
Edmonton	201,290	97,645	1,092,220	1,729,810

WE have received from Glenn Brown, secretary of the American Institute of Architects, a copy of the proceedings of the forty-second annual convention of the Institute, held in the city of Washington, December 15, 16 and 17, 1908, and the Memorial Meeting in appreciation of Augustus Saint-Gaudens at the Corcoran Gallery of Art. It is a volume of 270 pages, bound in paper covers and is arranged typographically in a style in keeping with the standard established by the publishers for many years back. It is edited by the secretary of the Institute.

A MOVEMENT is under way among the leading contractors at Devil's Lake, N. D., looking to the formation of a Builders' Exchange. Architects, contractors and material men of the State realize the value of such an organization, and, noting the results accomplished by the exchanges at Fargo, Grand Forks and Minot, it seems probable that additional organizations will be formed in the larger towns in the near future.

THE new playhouse which is to be erected at Broadway and Forty-sixth street, Borough of Manhattan, N. Y., from plans drawn by Carrere & Hastings, will involve an estimated outlay of something like $1,000,000, exclusive of the site, which is said to cost $600,000. The plot of ground is somewhat irregular in shape and measures 139 x 100 ft., with a Broadway frontage of 23.1 ft., thus making it one of the largest theatres yet established in the vicinity of Longacre Square.

WHAT will be when completed the largest lodging house on the Bowery, Borough of Manhattan, N. Y., is the 10-story fireproof building to cost $125,000, for which plans have just been filed by Charles M. Straub, of 147 Fourth avenue.

CONTENTS.

Carpentry and Building

NEW YORK, SEPTEMBER, 1909.

Seashore Bungalow at Bay St. Louis, Miss.

A DESIGN especially adapted for the seashore and one which was executed a year ago this summer at Bay St Louis, in the state of Mississippi, forms the subject of the present article and of the illustrations accompanying it. The design was one of those accorded "Honorable mention" in our recent competition. The Bungalow is a braced frame building set on brick piers with lattice panels between. The walls are covered with beveled cypress weatherboards applied directly to the studding without the interposition of sheating or building felt. The roof is covered with sawed cypress shingles laid on pine sheathing boards. The porches have floors of 1⅛-in. yellow pine tongued and grooved material laid with leaded joints and are ceiled with ¾ in. beaded yellow pine. The mill work of the porches, cornices, &c., is of cypress, while the doors, sash and interior trim are also of cypress, but of selected grain. The floors of the various rooms are of ⅞ in. tongued and grooved yellow pine. The interior walls, partitions and ceilings are covered with dressed and matched pine shiplap ceiling boards. All openings have neat 5½ in. hand molded casings with molded nosing and aprons on windows.

The fireplace in the living room is constructed of red pressed brick laid with black cement joints and has fire-brick lining in the opening. The hearth is of green tile. The mantel and the brackets with wall board above are of cypress.

In the pantry is a dresser having glass doors above a counter-shelf and panel doors below. The storeroom is fitted with shelving and has a sliding paneled pass window opening into the kitchen.

The hardware is of plain design solid pressed bronze for lock fittings and bronze plated iron butts and sash fittings. All locks are mortised and all sash are double hung on balanced weights.

There is no cellar under the building, while the climate of the locality is such that no heating is provided or required beyond that furnished by the open fireplace in the living room. The water service is taken from the city supply by a 1 in. galvanized pipe leading to two ¾ in. yard hydrants and to all fixtures by ¾ in. and ½ in. branches. In the kitchen is provided a 30 gallon galvanized iron boiler and stand, and a 20 x 30 in. enameled sink with drip board. The sink is supported on painted iron brackets and is supplied with hot and cold water

Perspective as Reproduced from a Photograph.

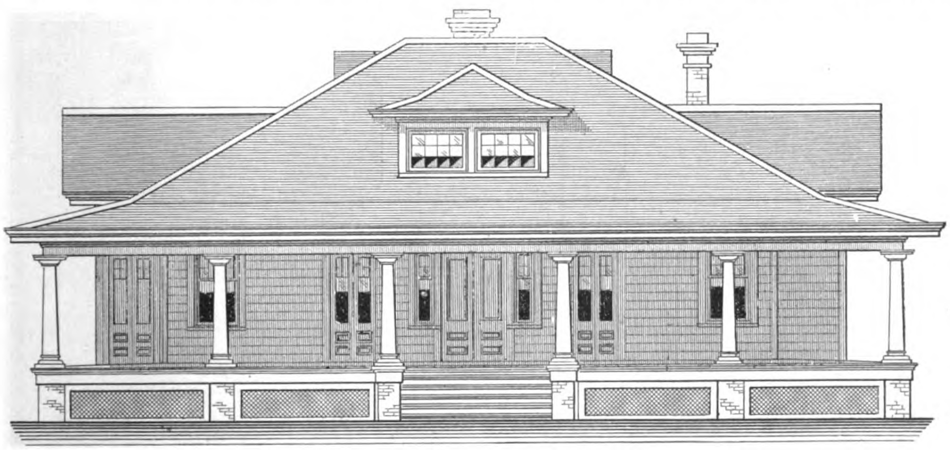
through Fuller cocks. In the pantry is provided a similar sink 16 x 24 in. in size with drip board.

The bathroom is fitted with a 5½ ft. roll rim enameled tub, with a combination supply for hot and cold water, a porcelain polished oak trimmed low down tank, syphon jet closet and an oval bowl, integral porcelain corner lavatory with hot and cold water supplied through Fuller cocks.

There being no sewer the soil is taken from the closet to a brick open joint cesspool built entirely beneath the ground. The waste from sinks, bathtub and lavatory is taken through clay drain pipes into which the roof water is also led to a dry well constructed of oyster shells beneath the ground in the porous sandy soil of the yard.

The building is wired for electric lights and fitted with neat simple fixtures of old brass finish.

The woodwork of the family rooms is finished in dark green Mission stain and waxed. In the bathroom passageway and pantry the woodwork is painted white enamel. The kitchen stairway and servant's room have the woodwork painted a light gray. The walls and ceilings of the servant's room, storeroom and kitchen are painted a light tan. The pantry, passageway and bath-



Front Elevation.—Scale, 3-32 In. to the Foot.

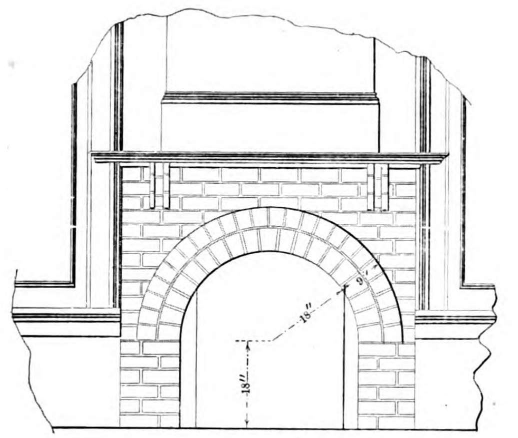
A Seashore Bungalow at Bay St. Louis, Miss.—Southron R. Duval, Architect, 606 Common Street, New Orleans, La.

room have the walls painted white. The walls and ceilings of the hall, living room, bedrooms and closets are covered with cloth wall paper in selected design and colors.

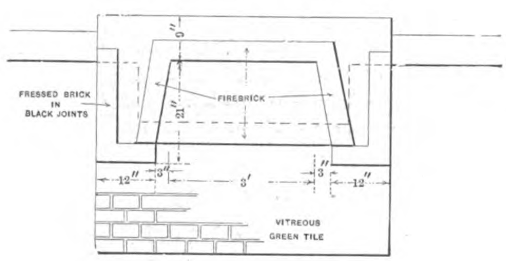
There are no stairs leading to the attic, but access to it is furnished by means of a trap door in the bathroom passageway in combination with a stepladder.

The exterior wood and iron work of walls and cornices are painted three coats lead and oil, the weatherboards, window sash and lattice panels being dark green, while the other portions are colored white. The roof shingles are a dark red, having been treated to two coats of creosote stain. The porch floors and step buttress caps and treads are painted three coats of lead color, while the ceilings of the porches are hard oiled, two coats.

In the rear yard a coach house is provided, the construction and finish matching the Bungalow. There is a



Elevation of Open Fireplace.



Plan of Open Fireplace and Hearth.
Scale, ⅜ In. to the Foot.

A Seashore Bungalow at Bay St. Louis, Miss.

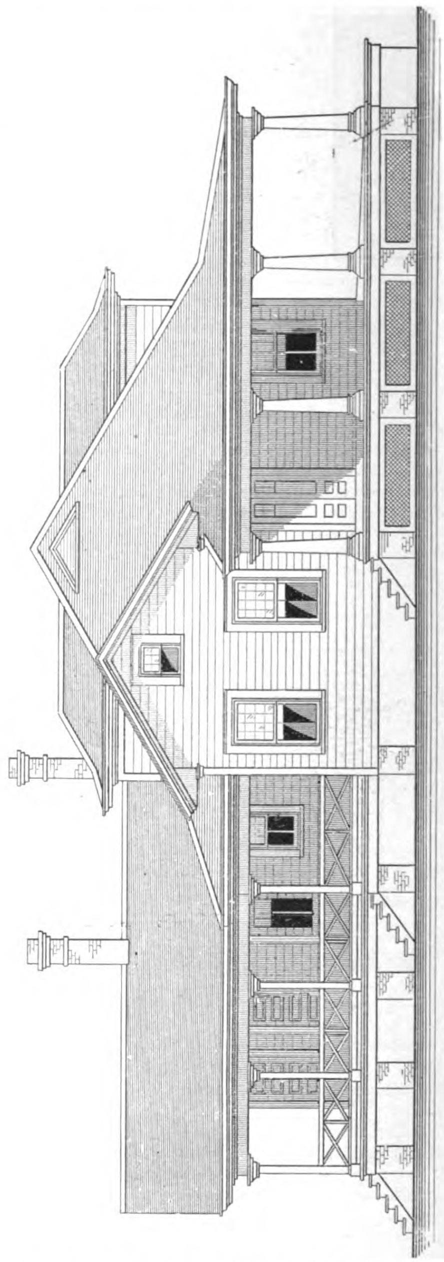
carriage room for two vehicles, two horse stalls, a feed and harness room and a servants' toilet with open earth vault.

The house, including the yard, building and fences, complete, as described, was completed in August, 1908, at a total cost of $2,971, divided as follows:

Excavating and brickwork	$175
Lumber, ceiling, flooring and shingles	700
Carpentry work and nails	680
Mill work	560
Glazing	35
Metal work	90
Hardware	48
Paint and painting	250
Plumbing	110
Electric work and meter	38
Outbuildings and fences	125
Drains	65
Electric fixtures	35
Wall papering	60

The prices prevailing at the place and time of building were as follows: Common labor (excavating, &c.), $1.50 per day; skilled bricklayers, $3.50 per day; bricklayers' helpers, $2 per day; skilled carpenters, $2.50 per day; carpenters not skilled, $2 per day; handy men, $1.50 per day.

Cost of materials used embraced the following: Framing lumber, B and C grades on bills, $15 per M; ceiling and ⅞ in. flooring, B grade, $20 per M; porch flooring, B grade selected, $25 per M; shiplap ceiling clean face, $10 per M; shingles (best 16 in. sawed cypress), $4 per M; brick—out of town for facing, $9.50 per M; brick—local for backing, $8 per M.



Side (Left) Elevation.—Scale, 3-32 In. to the Foot.

The Bungalow, as above intimated, was erected on the seashore at Bay St. Louis, Miss., in August, a year ago, in accordance with drawings prepared by Architect Southron R. Duval, 606 Common Street, New Orleans, La.

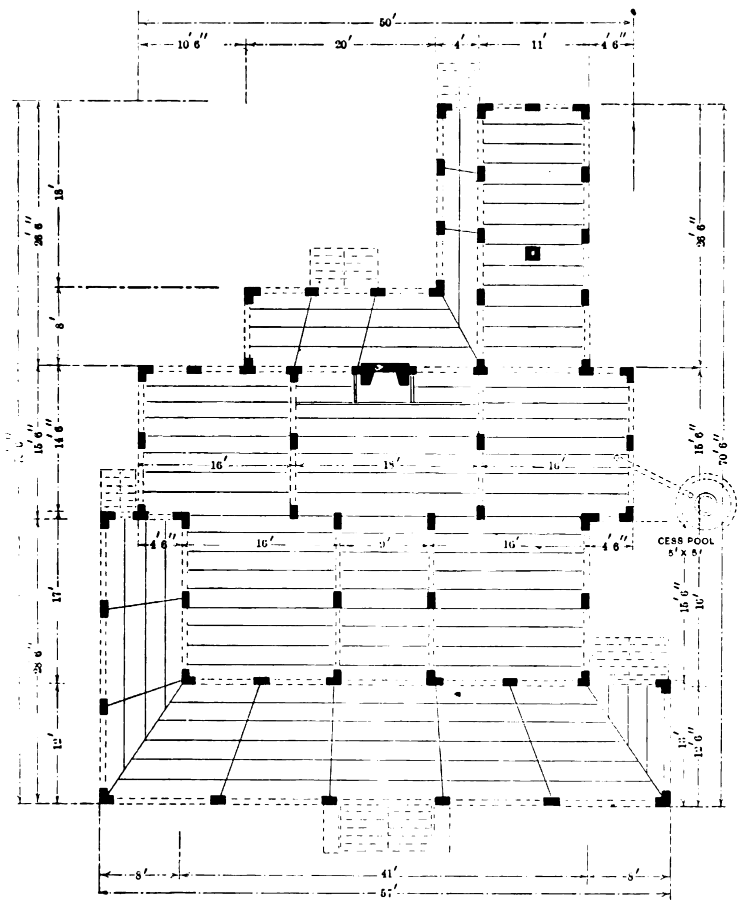
Causes of Decay of Building Stones.

The causes of decay in building stones are various and depend on the physical structure of the stone, its composition and the nature of the surrounding atmosphere, says the *Building World.* The most destructive agent to which the stone is exposed is rain or a moist atmosphere. and also, in a minor degree, wind, frost and smoke.

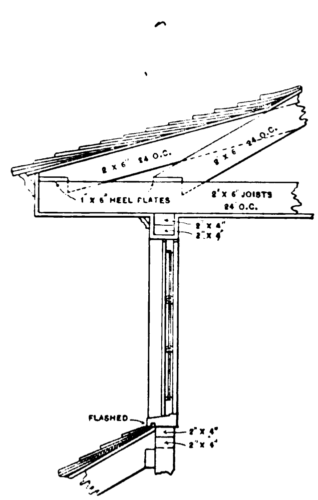
The air of large towns is usually charged with various deleterious acids; these acids are dissolved by the rain, which penetrates the stone in a greater or less degree, according to its physical structure, and combines with the constituents of the stone, causing it to decay, so that any contrivance that will check the admission of water will be most likely to succeed in arresting decay.

Timber Consumption in United States.

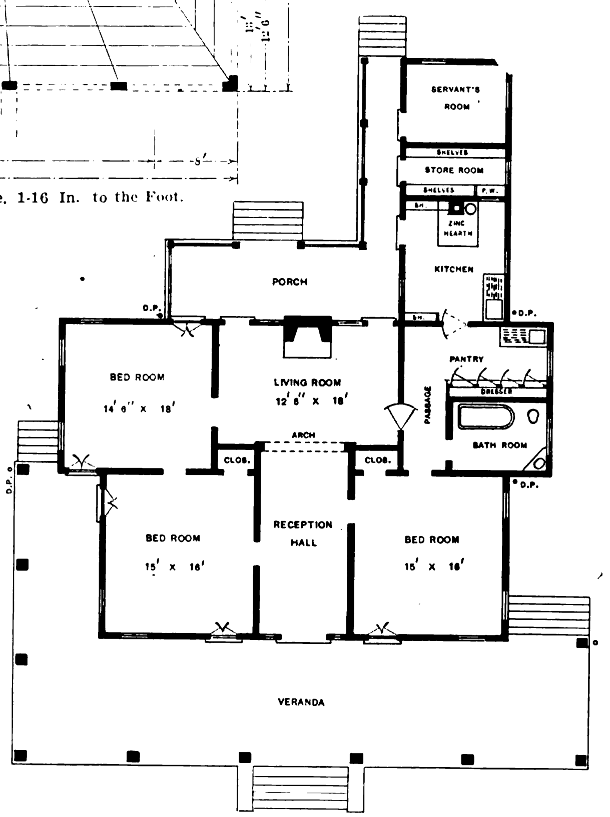
The systems of forest management and wood utilization in the United States and Germany offer many interesting comparisons. The United States takes 260 cu. ft. per capita annually from the forests; Germany uses but 37. In other words, this country is already using seven times as much timber per capita as is Germany. American forests are now producing not more than 12 cu. ft. per acre; German forests are producing 48 cu. ft. per acre annually, according to the United States Forest Service. Germany has reduced waste and consumption and increased production.



Foundation, Showing Location of Brick Piers.—Scale, 1-16 In. to the Foot.



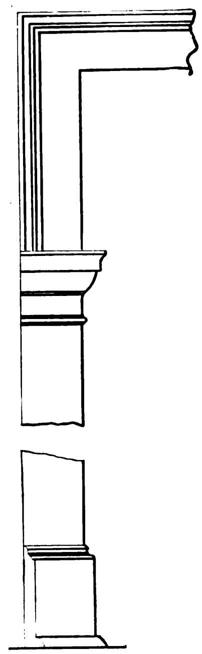
Detail of Dormer Windows.—Scale, ⅜ In. to the Foot.



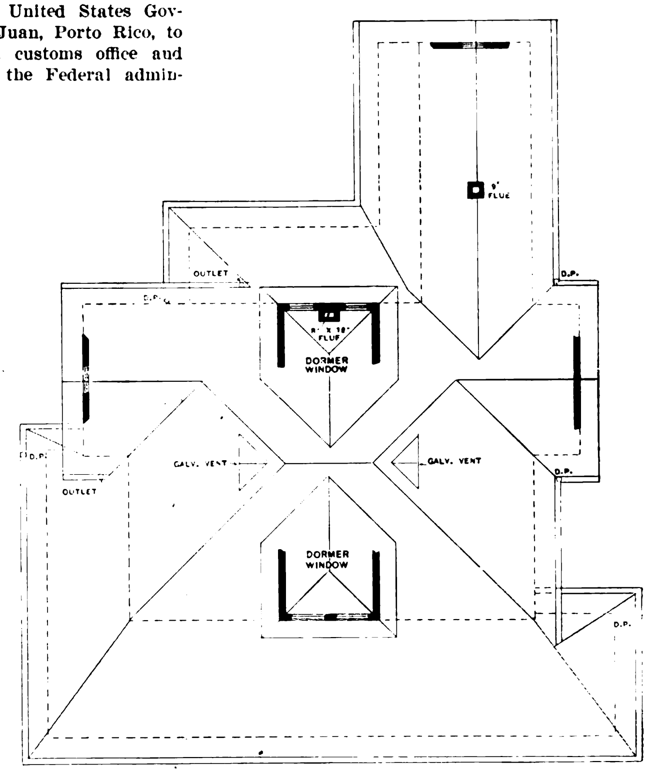
Main Floor Plan.—Scale, 1-16 In. to the Foot.

A Seashore Bungalow at Bay St. Louis, Miss.

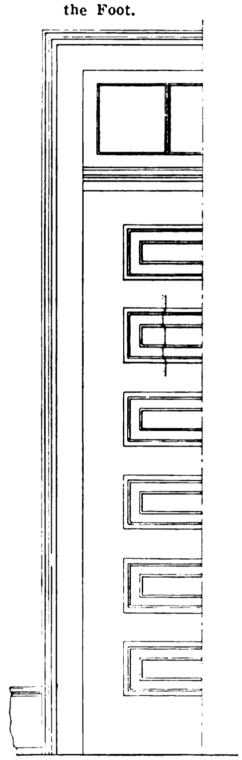
THE public building which the United States Government is about erecting at San Juan, Porto Rico, to shelter the post office, the courts, customs office and other departments connected with the Federal administration on the island will be of reinforced concrete and cost about $400,000. It will be 228 ft. long, and will have floors of concrete with inside walls finished in brick of various colors.



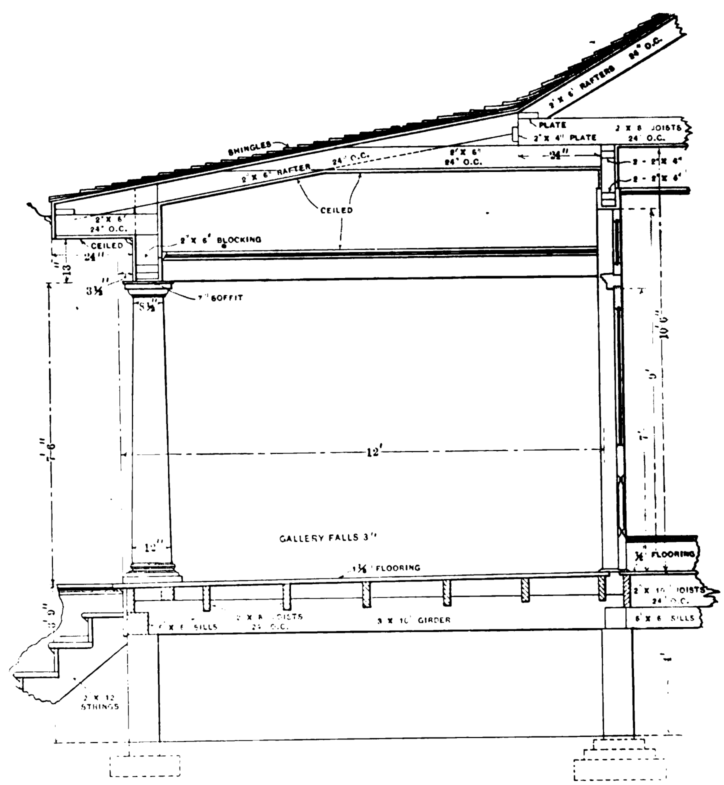
Detail of Hall Arch.—Scale, ¾ In. to the Foot.



Roof and Attic Plans.—Scale, 1-16 In. to the Foot.



Detail of Hall Doors.—Scale, ½ In. to the Foot.



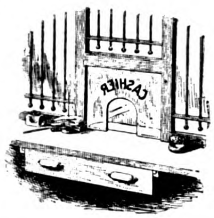
Details of Veranda.—Scale, ¼ In. to the Foot.

Miscellaneous Constructive Details of a Seashore Bungalow at Bay St. Louis, Miss.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—VII.

BY EDWARD H. CRUSSELL.

IN the present day of departmental stores and mail order houses, when a cash till fitted complete with an alarm bell and combination lock may be bought for $1.99, it might possibly be thought that instructions in the method of making one would be both out of date and superfluous. To this the writer would reply that the idea really is instruction in the methods of making a drawer, and that the drawer was made a cash till so as to cover as many phases of work as possible with the one subject. It might be further argued that there are still some people who, in spite of the price, prefer the old fashioned kind. This the writer can testify from personal experience, he having occasionally been called upon to replace the $1.99 article with something more substantial and satisfactory.



To make and fit a properly dove-tailed, smoothly running drawer is very good evidence of the workman's material may make the dovetailing practically useless. The writer is pretty certain that most of the readers of this journal know what is meant by "pin" and "tail," but a little too much explanation is never out of place, so we will just mention that in Fig. 36 the reference letters A, A, A are the pins and B, B are the tails.

We show in Fig. 37 the lap-dovetail, used chiefly at the front ends of drawers. In it the tails which are always on the sides of the drawer are usually made from two to four times as large as the pins. There is no set rule, the workman being governed by his good taste and using a size that will evenly divide his material. Please notice in the figures that the dovetailing always starts and finishes with a half pin, which is correct construction.

The miter dovetail is shown in Fig. 38. This is very much more difficult to make than the others, is not as strong as either of them and is seldom used by the carpenter.

There are two general methods of marking and cut-

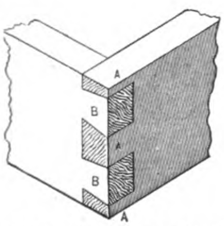


Fig. 36.—The Common Dovetail

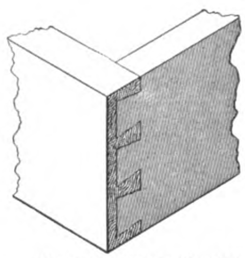


Fig. 37.—The Lap Dovetail.

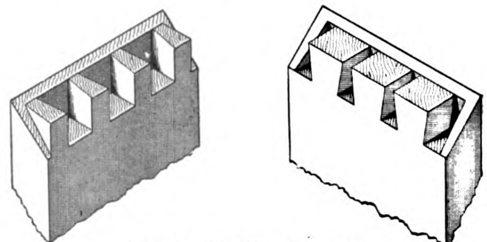


Fig. 38.—The Miter Dovetail.

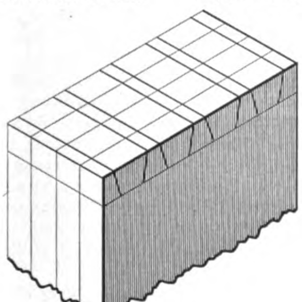


Fig. 39.—Showing Method Where Several Pieces of Same Size Are to Be Cut.

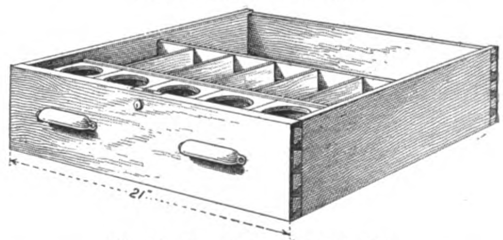


Fig. 40.—General View of Cash Till.

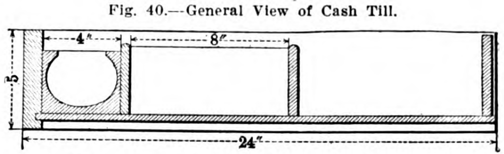


Fig. 41.—Longitudinal Section of Cash Till.

The Jobbing Carpenter and Some of His Work.—VII.

ability in the use of his tools, and any one seeing him accomplish this much might safely argue that he could do more. There are various ways of doing the work, but to save space the writer will confine himself to the method he himself has been in the habit of using and purposes opening the subject with a few remarks upon the topic of dove-tailing.

There are shown in Figs. 36, 37 and 38 three general styles of dovetailing. Fig. 36, the common dovetail, is the easiest of all to make and is used where strength is of more consequence than appearance, chiefly for the corners of boxes and chests or at the back end of drawers. It has some variations, but usually both pins and tails are made of equal size, and in the best work of about the same width as the thickness of the material. In cheaper work they are often made much wider than this, but if made too wide the shrinking of the

ting dovetails. In one the pins are first cut and the tails marked from them and cut afterward. In the other the tails are cut first and the pins last.

The novice will perhaps think that it cannot matter much which method is used, yet this is a subject that has been the cause of many heated arguments. Briefly, the advantages claimed for each method are as follows: It is easier to cut the pins first and mark the tails from them, especially in lap-dovetailing, in which form the pins are by far the most difficult part of the work, and if they are cut first any little slip made can be easily rectified before cutting the tails. There is another advantage—the experienced workman can train himself to cut the dovetails by this method without using anything for marking the bevels. This we shall illustrate further along. The only advantage claimed for the second method is that when there are a number of pieces all of one size to be cut—say, the sides of a number of drawers—they may be clamped or braded together and all sawn at once, as illustrated in Fig. 39. Some

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—EDITOR *Carpentry and Building.*

mechanics think this a big saving, but really the sawing of the tails is but a small part of the work, and the writer has some doubt if the time saved by this method will compensate for the increased difficulty of marking and cutting the pins.

We show in Fig. 40 the interior arrangement of one style of cash till, of which Fig. 41 is a longitudinal section. The sizes marked are arbitrary and may be altered to suit local conditions, except that the receptacles for the bills should be kept as near as possible to the sizes of the bills they are intended to accommodate. The coin bowls are sometimes made smaller than shown, but more often they are larger. Note the shape of the cavity in them. This is the best form for the easy withdrawal of the coins, and is, therefore, important. The back portion of the till may be left as shown, or divided into spaces to suit the user.

There are other ways of arranging a cash till than that here illustrated. Sometimes the bill spaces are placed at the front, with the coin bowls behind them; in others the coin bowls are all made in one piece and arranged to slide back and forth above the bill spaces. It depends very much upon the space the till is to occupy and the pet notions of the person who is to use it.

Sizes of Materials.

The different thicknesses of material mostly used in drawer construction are ⅞-in. for the front, ½-in. for the sides and back and ⅜-in. for the bottom. Usually all the interior or hidden portions are made of pine or other soft wood. It is well to increase the thickness of the sides in a cash till to ⅝ and even ¾ in., and the substitution of hard wood for soft will make the till "run" much easier and wear much longer. This is a fact often overlooked, although the difference in cost is but a trifle.

In commencing to make a cash till cut out and glue up the bottom, first making it an inch or so longer and wider than the finished size, always remembering that the grain of the wood in the bottom must run crossways of the drawer. It may be jointed and glued in accordance with the instructions for making a counter top in the June issue of *Carpentry and Building*, and should be set aside for the glue to harden while the other portions of the drawer are being made. The inside of the drawer front is the face or working side and the lower edge is the face edge. Many mechanics make the mistake of working from the outside of the drawer front and get poorly fitting dovetails as a consequence. The inside surface of the drawer front must be dressed perfectly flat and out of wind, after which it is cut to size and the edges made exactly square with the face side. The sides of the drawer are cut about ¼ in. wider and longer than the finished size. They are made exactly square on the front and lower edges, while the back and top edges for the present are left as from the saw. The back of the drawer is cut to length, and in width it is made ⅛ in. less than the inside depth of the drawer. At this point it will pay to notice carefully for a moment Fig. 41 and observe the various details which are involved.

The easiest way to square the ends of the pieces is as follows: "Joint" and square the lower edge first, then mark the exact length and square it across both sides of the board with a knife edge. Use a full sized steel square to do the squaring, and make the knife marks deep. Cut as close as possible to these marks with a fine toothed saw and take a small corner off the rough edge of the board with a chisel.

The board may now be fixed in the bench vise and the end edge planed as easily as the side. The knife marks serve as an excellent guide for keeping it square and the small corner that was taken off will prevent the boards splintering. A glance at Fig. 42 will make everything clear, for at "A" is shown where the corner was taken off, and the arrow indicates the direction of the plane. Of course, this little chamfer must not go further back than the true width of the side. One of the reasons for leaving the top edge of the side rough is to enable us to cut off this little corner. After the ends are square the top edge of the drawer front is gauged and squared also, but the top edges of the sides are left rough until the drawer is ready for fitting. The back being ⅛ in. lower than the sides allows this to be done easily. This ⅛ in. also provides an outlet for the air from behind the drawer, and is a necessity if the top of the drawer comes close up to the framing.

The plow grooves to hold the bottom can now be made, with the top of the groove ⅞ in. up from the bottom edge of the drawer, after which we can proceed with the dovetailing. Set a cutting gauge just a shaving less than the thickness of the drawer sides and with it mark across the inside face of the drawer front, gauging from the ends; also mark across both sides of the back, gauging from the ends in the same way. This gives us the length of the pins. Now set the gauge to the length of the tails, which should be about three-quarters the thickness of the drawer fronts, and with it gauge a line on the end of the front, working from the face side. Use this same gauge to mark the front ends of the sides, but the back ends must be marked with square and knife edge. The foregoing will explain why it is so necessary to have the ends square both ways.

Fix the drawer front in the bench vise with the inside face toward you and proceed to space out the dovetails. Roughly mark the pins and tails about the size you want them. After finding how many are required it is easy to make any little alteration in the size so as to have them come out even. The inexperienced workman usually makes the mistake of giving his dovetails too much bevel, which makes them harder to fit and at the same time weakens them. A bevel of about one in six is plenty. You may set a bevel or make a template to these figures if you choose with which to mark out your work, but if you desire to become proficient in the art it would be better to commence to practice cutting the bevels by the eye alone.

With the drawer front fixed in the bench at the proper hight for cutting, mark out the spaces and square them down to the gauge line, then take the dovetail saw and, holding it at the proper bevel, cut down this line to the marks. There is just one little thing in this for you to remember. Make all the cuts that point in one direction first—that is, cut only one side of each pin right across the drawer front and then reverse and cut the other sides. If you try it this way you will be surprised how easy it is—much easier than keeping the correct bevel all down a long line of saw teeth, though as we all know practice soon makes even this thing easy—while if you try to cut both bevels as you go along you will find it as hard as it would be to file both sides of the teeth of your saw in the same manner. A study of Fig. 43 will perhaps make the foregoing more easily understood. The light lines show the gauge and square marks, while the heavy lines show where one side of each pin has been cut and the dotted lines show the bevel of the side that is yet to be cut.

A Dovetailing Chisel.

After the sawing has been done proceed to chisel out the spaces between the pins, great care being required during this part of the work. Do not cut back to the line until you are making the finishing cuts. If you have much dovetailing to do provide yourself with a chisel, ground as shown in Fig. 44, which is handy for getting into the corners. Notice that it is beveled both sides like a carver's chisel, instead of which you may have two chisels ground on one side only—one right handed and the other left. This, however, means a lot of picking up and laying down of tools.

When you have the pins finished lay one of the sides on the bench, stand the front over it in the correct position and mark the outline of the pins onto the side with a fine marking awl. Treat the other side in the same manner. Fig. 45 will explain what is meant. Notice how the gauge line on the side gives the correct position for placing the front. If you wish to make the tails very tight move the front inside the gauge lines just a trifle.

After marking and sawing the tails for the front end the next step is to brad the two sides together and cut the dovetails for the back of the drawer according to the second method. It will be found much harder to guess the correct angle for the saw by this method, and it will probably be necessary to use a bevel or template for marking the tails. After they are cut fix the back of the drawer in the bench vise, lay the side in position on top of it and mark the pins. The back is kept up an inch or two from the surface of the bench, and a plane or block of wood laid behind it on which to rest the side. A glance at Fig. 46, which is an end view of the arrangement, should make everything clear.

Beveled edge chisels are the proper ones to use for dovetailing, especially for cutting out the spaces between the tails.

The cross partitions that form the ends of the bill spaces in the cash till are grooved into the sides and these grooves should be cut before the till is put together. Indeed, it is good practice to cut these grooves before the dovetailing is finished, in which case the material may be fastened to the bench through the small pieces that are afterward to be cut away. As shown in Fig. 41 the partitions do not run to the top of the drawer but are kept down ½ in. They are first marked out with a knife edge and then a small mortise as deep as the groove and about an inch long is made at the upper end. The balance is then taken out with saw and chisel. The bottoms of the long grooves are leveled off with a router or with a home made appliance known as an "old woman's tooth," which is nothing but a small block of wood with a plow iron fixed in it and projecting the proper distance. Grooves no longer than those in question can, however, be brought to the correct depth with the chisel alone.

The dovetails may now be glued and driven together. Use plenty of glue, but keep it where it belongs, as it is a disagreeable thing to clean off after it becomes hard. It is not always an easy matter to get a glue brush of just the right size and shape for dovetail work, but one may be manufactured from a small piece of tin tubing and a quantity of bristles cut from a 10-cent paint brush. Wind the bristles with thread, insert them in the tube and hammer flat. In this way you can make a brush any size required and one that will not shed its bristles.

While the glue is drying we can clean off the drawer bottom and cut it to size, also make the receptacles for bills. The divisions between these spaces should be made as thin as convenient to work. They are fixed into cross partitions in the same manner that the cross partitions are fixed into the sides of the drawer, and they may be fastened together before being put into place

It is often a good plan to fix the drawer lock before putting in these divisions, as after they are in there is not much room between them and the drawer front in which to work a chisel or screwdriver. We will not at present discuss the matter of fixing the lock, as it is a subject to be taken up later.

The partitions are inserted from the bottom side of the drawer and the drawer bottom is then slipped into the grooves provided for it. It is fixed at one end only so as to allow it to shrink without splitting. If it is narrow it is fixed with brads at the front end. If it is so wide as to be liable to sag the groove in the front is made a little deeper and the bottom is fixed to the back of the drawer with screws.

The coin bowls will, of course, have to be turned, as they are a job outside the equipment of the average jobbing shop, and can be made to order quite cheaply outside. In the present example they are made separately and fitted neatly into the space they are to occupy.

In fitting the drawer, dress off the top edges, smooth up the sides and try it in place. If it sags try it up and down and sideways to find which part wants easing. Sometimes a workman will be planing away at the edges when it is the sides that are sagging and *vice versa.* If you run a drawer back and forth a few times it will show a bright spot where it is binding. After the sides of the drawer are fitted, clean off the front flush with the framework, and, if necessary, fix a stop to prevent the drawer going in too far. It is best wherever possible to have the back ends of the drawer sides form the stop by butting against the framing.

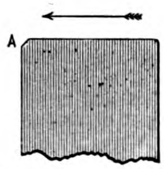


Fig. 42.—Board with Corner Taken Off at at "A."

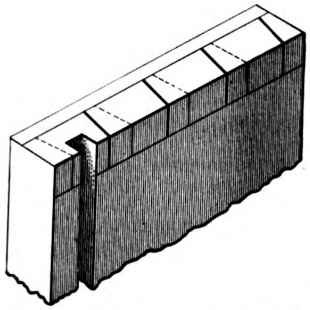


Fig. 43.—Cutting the Dovetails for the Drawer Front.

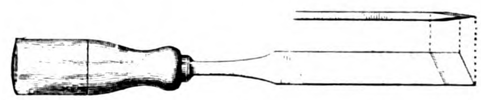


Fig. 44.—Chisel for Dovetailing.

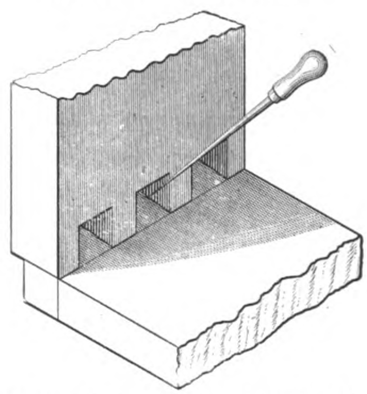


Fig. 45.—Marking the Outline of the "Pins" on to the Side of the Drawer.

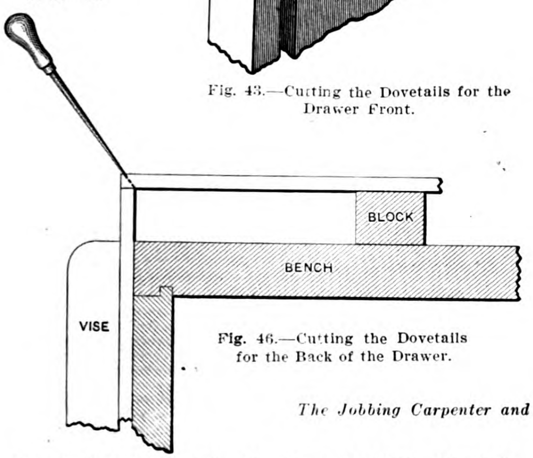


Fig. 46.—Cutting the Dovetails for the Back of the Drawer.

The Jobbing Carpenter and Some of His Work.—VII.

Proper Method of Driving Nails.

It is probable that very few mechanics appreciate the fact that it makes a difference whether a nail is driven home by a single blow of the hammer or whether several taps are used for the purpose. According to a writer in a recent issue of the *Scientific American* it makes a vast difference as to the way in which a nail is driven, as may be judged from the following comment:

"A fledgling mechanic, who spoke sneeringly of a man whom he heard using several blows of the hammer to drive a single nail, was somewhat crestfallen when told that the nail would hold better when driven 'home' by several light taps, than when driven by one heavy one, . . . because when you drive a nail home with a heavy blow it is apt to rebound a trifle, loosening the grip of the wood fibers on it."

CONSTRUCTION OF WOOD FLOORS ON CONCRETE BEDS.

THERE are at the present day in connection with building construction many conditions which call for a concrete floor with a wood finish, as it might be termed; that is, a wooden floor laid upon a concrete bed. There are several ways of constructing such a floor, and in a recent issue of one of our London contemporaries a writer describes four methods of making such a floor, brief reference to which may not be without interest to many readers of this journal. Floors constructed as here shown are capable of carrying heavy loads wtih great economy of timber as regards the size of joist to be used.

In the methods described any of the usual joints may be adopted instead of rebated and filleted flooring, while if hardwood is the material the spacing of the joists must be altered to agree with the holes bored for the nails, for hardwood flooring is generally supplied ready bored for

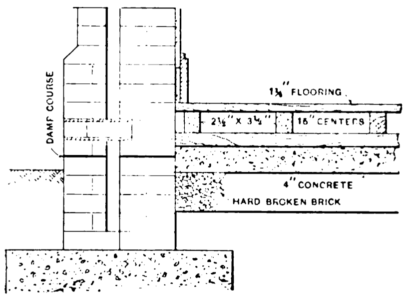


Fig. 1.—One Form of Arranging the Various Parts.

secret nailing, the holes being at regular intervals. The writer in question further continues:

The following is a description of the floor illustrated in Figs. 1 and 2, the latter being a longitudinal section of the floor shown in the first illustration. Excavate over the area of the building as may be required; then level and prepare the surface and provide and lay hard broken brick rubbish 6 in. thick, to be free from dirt, chips, shavings and organic matter, to be thoroughly rammed and left even and level on the surface. If a good hard bottom is found upon excavation the broken brick may be dispensed with. Upon this filling provide and lay Portland cement concrete, 4 in. thick, composed of 1 part of cement to 5 parts of clean gravel shingle or broken stone, ¾ in. gauge, containing just sufficient fine stuff or sand to fill up the interstices, level and beat down the same until it becomes pulpy, and the fat or cement portion is brought to the surface, which should be then floated to a fair surface.

The sleeper plates should be of fir, free from defects of every kind, 2 in. by 3 in., bedded in cement evenly and truly on the layer of concrete referred to above at

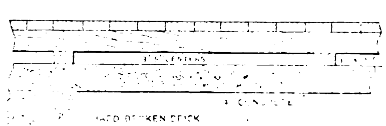


Fig. 2.—Longitudinal Section Through Floor Shown in Previous Figure.

intervals of 3 ft. 6 in. center to center; the joists to be of fir 2½ in. by 3½ in., spaced 1 ft. 3 in. center to center, and securely fixed to plates by two 2½-in. wrought iron nails at each support.

The flooring should be of yellow deal in 4½ in. widths and 1¼ in. thick, laid with rebated and filleted joints with splayed headings. Fillets should be ⅜ in. by 1 in., and should be painted one coat before being laid. The flooring boards should be secured with cut flooring brads, two to each joist, weighing 20 lb. per 1000. The edges and rebates of the boards should have a thick coat of white lead paint applied when being laid and before being cramped up.

Provide and build in, in cement, at intervals of about 6 ft., strong cast iron galvanized gratings 9 in. by 3 in., with galvanized cast iron sleeve 9 in. by 3 in., built in behind air grating through wall cavity.

The floor shown in Fig. 3, and of which Fig. 4 is a longitudinal section, is, as regards preparation of ground,

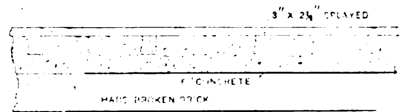


Fig. 4.—Longitudinal Section of Floor Shown in Fig. 3.

provision of hard, dry, brick filling, proportions, &c., of concrete, the same as the floor in Fig. 1, but the concrete is 6 in. thick instead of 4 in., and the sleeper joists are bedded in the concrete, being first creosoted to protect them from decay.

The sleeper joists should be of fir, free from all defects, and creosoted, 8 lb. to the foot cube, 2¼ in. by 3 in., extreme scantling, splayed one edge, and securely and evenly bedded in the concrete 1 ft. 6 in. center to center.

The fat portion is to be brought to the surface of the concrete, and all floated off level with the face of the sleeper joists, and upon this floated surface the flooring is laid in a bituminous composition, composed of tar and pitch, in the proportions of 100 lb. of pitch to 7½ gal. tar, boiled together for an hour or more, which will result in an elastic and tough composition when set. The

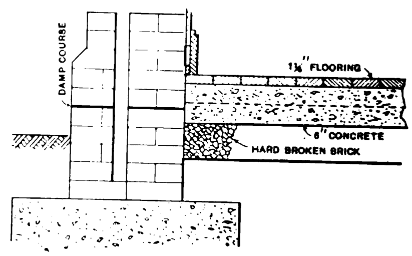


Fig. 3.—Another Style of Floor Construction.

Construction of Wood Floors on Concrete Beds.

dimensions of the sleeper joists are such as will admit of four being cut out of a 3 in. by 9 in. plank. The flooring is to be of yellow deal, in 4½ in. widths, laid with straight joints and splayed heading joints, secured to the sleeper joists with two brads to each joist, weighing 20 lb. per 1000, as in the other floor.

If preferred, instead of creosoted sleeper joists, concrete blocks 3 in. by 3 in., and, say, in lengths of 3 ft., may be bedded in the cement concrete in continuous lines at the same distance apart, the flooring brads being driven into the concrete blocks.

Moving a Church by Means of Wagons.

The task of removing a church bodily from one site to another has been successfully achieved near Liskeard, in Cornwall County, England. The mission church at Moorswater, being inconveniently situated, was transported on timber wagons to a more suitable site on the main road. The church was placed on the wagons by means of a powerful jack, and assisted into its new position on steel rails, the work of haulage being accomplished by six powerful horses. The structure, says the *Standard*, was of wood, with an iron roof, and weighed several tons, but after its journey showed no sign of strain or injury.

A ROW OF BRICK DWELLINGS IN QUAKERTOWN, PA.

(*With Supplemental plate.*)

ONE of the interesting features in connection with the row of nine brick dwellings which constitute the basis of the present article is the arrangement of the corner house shown directly in the foreground in the half-tone supplemental plate accompanying this issue of the paper. The plot of ground is so situated as to have a frontage on two streets, the house in the foreground making an angle of about 55 degrees with the others. An examination of the floor plans will give the reader a more adequate idea of the arrangement and the relative position of the house having a tower with the others constituting the row. The architecture of the several houses is varied, thus giving an attractive appearance when viewed from the street.

The cellar and porch walls as well as the foundations are made of local quarried stone laid in random courses with joints pointed with cement mortar above the finished grade line. The inside of the cellar walls are flush dashed and whitewashed. The cellars and coal cellars under the front porches have concrete floors, and the cellar drains connect with the sewer. The steps to the front porches are concrete, with concrete walks leading to the pavement. Each house has a lawn in front of the porch inclosed with a concrete curb to conform with the grade of the pavement and the hight of the porches.

The fronts of the houses as well as the sides of the end houses, together with all brick work, such as gables and walls above the roofs showing from the street, are of Tuna Valley brick made at Bradford, Pa., and are laid in red mortar. The flat roofs are gravel, and the other parts of the roofs are covered with slate, except the flat portion where the roofs of the first and second houses, shown in the foreground of the picture, join together, and the roof over the kitchen of the house at the southeast end or the last in the row, which are of tin.

The joists are 2 x 10 in. yellow pine for all floors, the latter being laid with No. 2 Carolina pine, with best selected for the first story. The finishing lumber for all outside work is either white pine or cypress, and is painted white.

The inside finish for the vestibules, halls, stairways, parlors and dining rooms in the first two houses at the west end—that is, those shown directly in the foreground of the half-tone picture, is quartered white oak, and for the last two houses at the end of the row, as seen in the distance in the picture, the finish is plain red oak, while for the remaining five houses the finish is chestnut. The kitchens as well as the rooms on the second and third floors are finished in Oregon pine, natural.

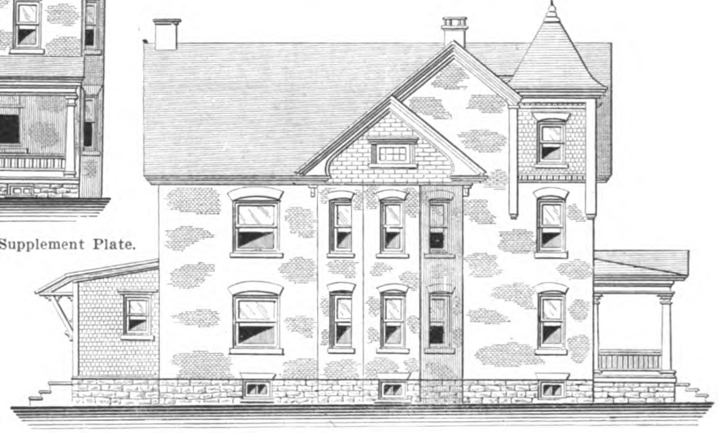
The vestibules have a paneled wainscoting 4 ft. high. The kitchens and bathrooms are wainscoted with a ½ x 2½ in. face V-bearded wainscoting and 1 x 3 in. cap molding. The front doors are 2 in. thick and veneered with quartered white oak, glazed with 1⅜ in. beveled edge plate glass. The vestibule doors are the same as the front doors, but have transoms and are of the same finish as the house. The doors on the first and second floors are 1⅜ in. thick, six-panel variety, solid molded, with raised panels, while the third floor doors are 1⅛ in. thick.

The architrave molding for doors and windows is ⅞ x 4 in., with an extra 1⅜ x 1⅝ back band for the first and second floors.

The front stairways have paneled and fluted newels and closed stringer 1⅜ in. thick, with turned shaft balusters, 2¾ x 3¾ molded hand rails, and stool cap grooved

Front Elevation of Last Houses in the Row.

Front Elevation of House in Foreground of Supplement Plate.



Side (Left) Elevation of House in Foreground of Picture.

A Row of Brick Dwellings in Quakertown, Pa.—Genaah Jordan, Architect, Coopersburg, Pa.

over the string board. The treads of the stairs are plain oak. The treads to the cellar and attic stairs are of yellow pine.

The base for the first and second floors is ¾ x 7 in., tongued into a surbase 1¼ in. thick by 1¾ in. high, and finished with a 1⅛ x 2½ in. lip base molding. The houses are plastered with three-coat work—two brown coats and a finishing coat of plaster of paris.

The windows in parlor and reception hall or those on the front porches are glazed with polished plate glass, while the other windows on the first and second floors are glazed with double thick American glass.

Each house has a neat mantel with a plate glass mirror. In each dining room is a corner china closet with plate glass in the door and a drawer below the door.

The houses are heated with hot air furnaces, and each house is fitted with a range in the kitchen having hot and cold water connections to the sink in kitchen and bathroom. Each kitchen is fitted with an enameled sink with enameled drip board.

The bathroom in each house is fitted with an enameled bathtub, high back enameled lavatory and low tank closet with oak seat. The bathroom has a medicine closet, with a plate glass mirror in the door. Each house has its own cesspool in the back yard.

The arrangement is such that all the houses have plenty of light in the various rooms, especially in the kitchen.

Entrance to the area at the rear of the houses is made by descending a few steps at the street front to an underground concreted passage, extending between the houses on a level with the cellar floor and with steps at the end rising to the rear yard.

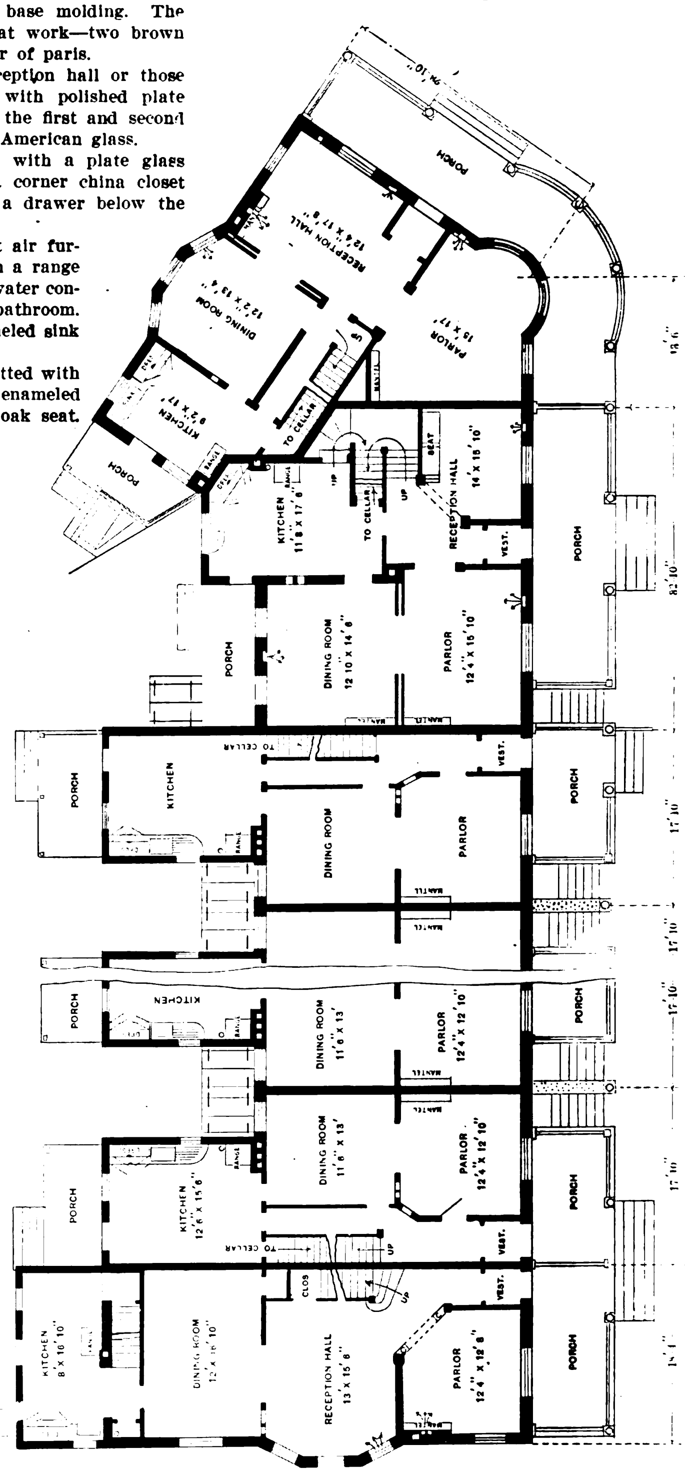
The row of nine brick dwellings here described was built for H. W. Stoneback, in Quakertown, Pa., in accordance with plans prepared by Architect Genaah Jordan, Coopersburg, Pa.

Mahogany as a Decorative Hardwood.

For refined expression in the manufacture of furniture and all other forms of interior decoration, mahogany is undoubtedly the peer of the hardwoods. No wood is so universally used to-day for this purpose in every city and country of the world; no wood is so freely and successfully imitated. America's architects and men of the furniture and cabinet-making industries draw heavily upon the markets of the world in the struggle to supply an ever-increasing demand for genuine mahogany. Hundreds of tons of logs annually are imported into this country and worked into beautiful forms to grace fine homes or dignify the interior of public buildings, large hotels or railroad cars.

A few years ago mahogany was regarded as a very precious wood, and was employed only in the interior of the finest houses and in the manufacture of the most expensive furniture. During the past few years, however, there has been a wonderful development in mahogany importation and use.

The total quantity of mahogany imported last year was nearly 42,000,000 board feet. Of this large amount North America supplied 65.6 per cent. and Eureope 18 per cent. Though Europe supplied only a little more than one-fourth as much mahogany as there was imported from North America, its average value per thousand feet was more than twice as much, due to finer quality. The remainder of the imports came from Africa, South America, and Asia.



A Row of Brick Dwellings in Quakertown, Pa.—Partial Plan of Main Floors. Scale, 1-16 In. to the Foot.

Mexico furnished 46.2 per cent. of the mahogany coming from North America, Nicaragua followed with 19.2 per cent., British Honduras with 15.5 per cent., Cuba with 8 per cent., and Honduras with 7.4 per cent. Other Central American countries furnished the small remaining percentage.

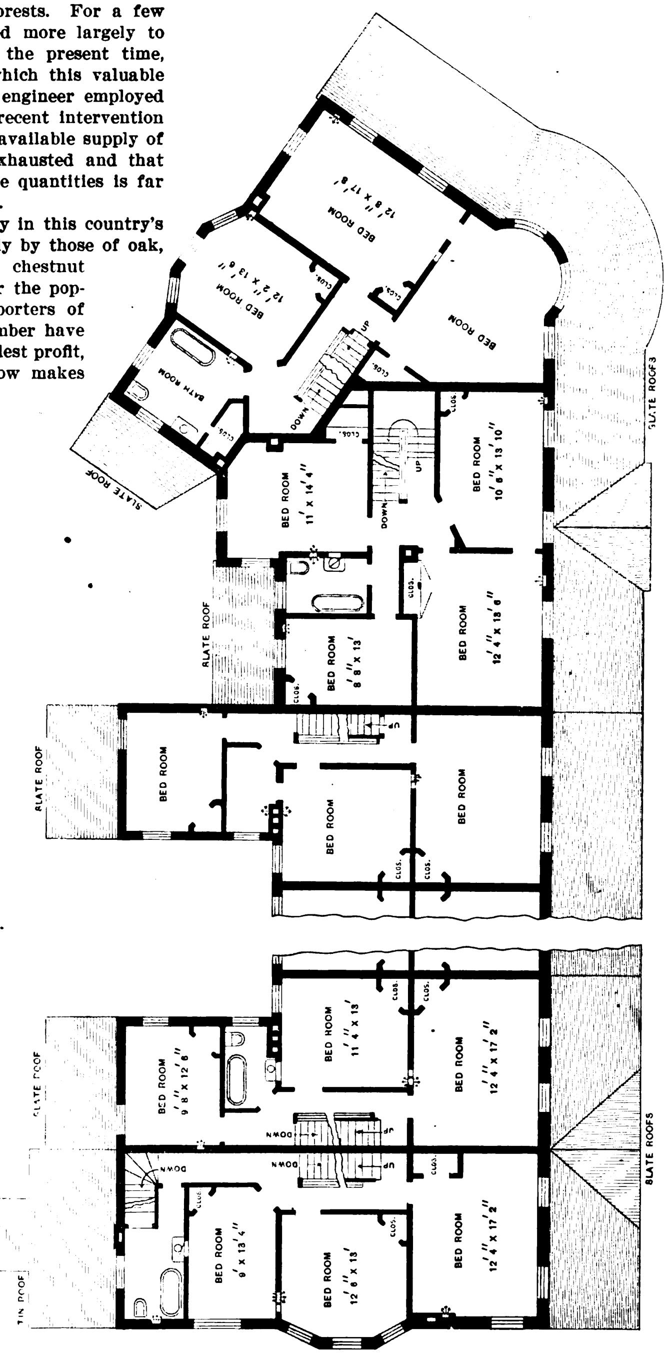
Immediately following the war with Spain, lumbermen of the United States exploited the largest and most accessible of the Cuban mahogany forests. For a few years the forests of Cuba contributed more largely to the supply in this country than at the present time, largely owing to the rapidity with which this valuable timber was logged and shipped. An engineer employed by American authorities during the recent intervention in Cuba claims that nearly all of the available supply of mahogany of that island has been exhausted and that what now remains in any considerable quantities is far remote from transportation facilities.

The number of buyers of mahogany in this country's hardwood market is now exceeded only by those of oak, maple, poplar, basswood, ash, birch, chestnut and cypress. The principal reason for the popularity of mahogany is that the importers of the logs and the manufacturers of lumber have never advanced its prices beyond a modest profit, and it is relatively so low that it now makes little difference in price whether an office building or a home is finished in mahogany or quartersawn white oak.

Another reason for its popularity is because it improves in tone with age. After much experimentation, car builders finish practically all of their cars in mahogany, as it withstands satisfactorily the severe usage, and also holds its finish. The chief centers of mahogany importation and manufacture are Boston, New York, Louisville, New Orleans, Chicago and Indianapolis.

The mahogany is the wood of a tree of Swietenia, of the natural family of Cedrelaceæ, named by Jaquin in honor of J. Van Swieten. The tree is one of the most majestic and beautiful, with large spreading head and pinnate shining leaves. The trunk is often 40 ft. in length and 6 ft. in diameter and is divided into many massive arms.

In the *London Timber and Trade Journal*, there appeared recently an interesting historical reference to the mahogany trade in England. According to this writer, mahogany wood was first imported by England in 1724, although in 1597 Sir Walter Raleigh demonstrated the great value of this wood which was used in repairing his ships at Trinidad. From 1724 until the discovery of the mahogany forests of Africa by Stanley, England and Continental Europe were heavy purchasers of mahogany from the West Indies, Honduras and Mexico. A great part of the mahogany used in this country in early years came from Europe, it having first reached there from the West Indies, Mexico and Honduras.



A Row of Brick Dwellings in Quakertown, Pa.—Partial Plan of Second Floors.—Scale, 1-16 In. to the Foot.

Test of Concrete Block Construction.

A striking demonstration of the results arising from the use of inferior materials in connection with hollow concrete block construction is found in the fire which destroyed the plant of R. J. Overall at Murfreesboro, Tenn., a short time ago. The building was 60 x 115 ft. two stories and basement in hight, and had walls of 10-in. single hollow concrete blocks, with outer and inner shell of block ranging from 2 to 4 in. in thickness, resting on a limestone foundation. The roof was of metal. The contents consisted of hay, sacked grain, feed, cotton and other sacked seeds and hardware. It should be noted that the only weight carried at all by the walls was the dead weight of the second floor and roof, for at the time of fire the second floor, used as a skating rink, was unoccupied.

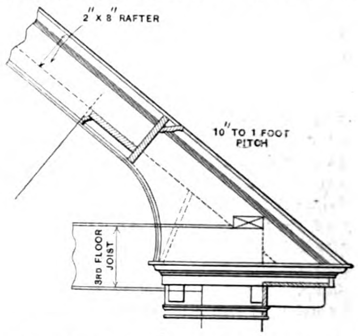
The inspectors of the Tennessee Inspection Bureau report on the results of the fire, which totally destroyed the building, giving the following conclusions:

The concrete blocks, though heavy, were manufactured of inferior materials, under light pressure and with no uniformity whatever. The combined effect of heat and water completely destroyed all mechanical strength. They were very porous, absorbed a great deal of water—no provision being made to fill small voids. The blocks subjected to most heat disintegrated badly; in falling they broke into small pieces, being no harder than unslacked lime. The mortar joints were imperfect and quality of mortar used poor. In fact, even had the blocks been good, it is to be doubted whether the wall would have stood, the heat evidently releasing all bond at mortar joints. The fire demonstrated the unreliability of this class of construction. The blocks and mortar joints may be good, or bad—though usually bad—and in order to obtain correct information on specific cases a fire is necessary and the information obtained—expensive.

Question of Roofing Materials.

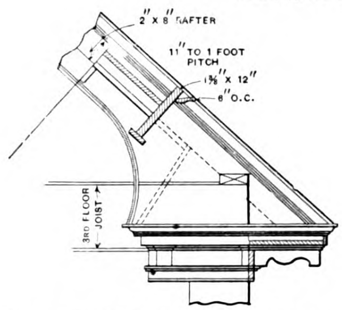
The question of roofing materials and their merits and advantages should be looked into by the contractor and builder, because it sometimes happens that his opinion is asked regarding the advantages of any particular kind for certain structures. The roofing industry, says a writer in the *Contract Record*, has become one of the greatest importance of late, and one that is being looked into from a more scientific point of view, so that the more education a builder has in connection with this industry the greater assistance it will be to him when the occasion arises.

There are so many points in connection with the various materials now in vogue, that he should make a careful study of these and in this way be able to make a wise suggestion when his opinion is sought. The wise contractor will bear in mind a suggestion that will be helpful to him in the hour of need, and it is good to remember that this is one feature of his industry that is worthy of deep consideration on his part.

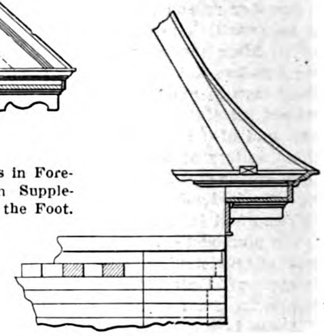


Detail of Main Cornice for Last Two Houses in the Row.—Scale, ⅜ In. to the Foot.

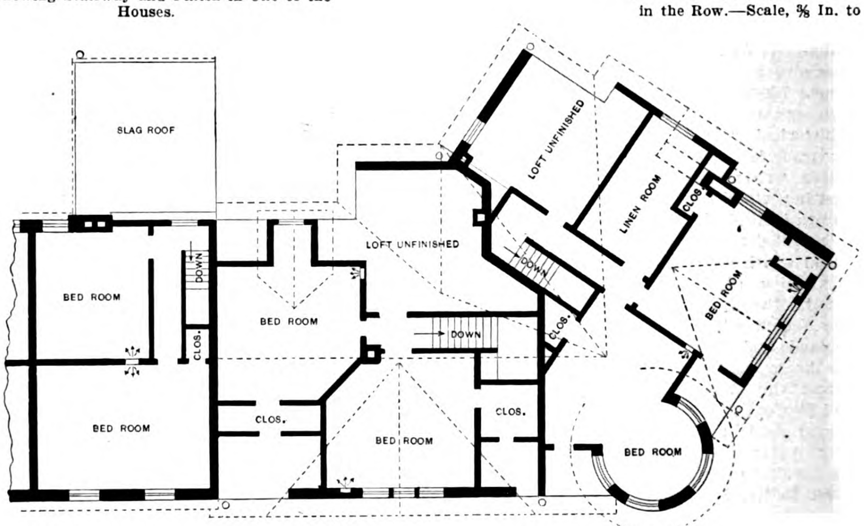
View Showing Stairway and Finish in One of the Houses.



Detail of Main Cornice of Houses in Foreground of Picture Shown on Supplemental Plate.—Scale, ⅜ In to the Foot.



Detail of Tower Cornice of Last House in the Row.—Scale, ⅜ In. to the Foot.



Partial Plan of Third Floors.—Scale, 1-16 In. to the Foot.

A Row of Brick Dwellings in Quakertown, Pa.—Partial Plan and Miscellaneous Details.

A ROW OF NINE BRICK DWELLINGS ERECTED FOR MR. H. W. STONEBACK, IN QUAKERTOWN, PENN.

GENAAH JORDAN, ARCHITECT

Supplement Carpentry and Building, September, 1909

FINISHING CONCRETE SURFACES.

THE original idea of monolithic concrete surface finish was a very smooth effect in the nature of a concrete sidewalk. This was accomplished by troweling, but from an artistic standpoint the results were not altogether satisfactory and at the same time the over-troweling of the surface, which was very likely to occur, caused it to crack. In an article dealing with the surface treatment of concrete the point is made by a writer in a recent issue of *Concrete Review* that the same effect may be produced by the use of a carborundum stone and the surface will not crack. After the forms are removed the concrete should be thoroughly wet with a brush and then rubbed with a coarse No. 16 carborundum stone, bringing the surface to a lather. After the stone has been used sufficiently to take off the rough projections the lather may be washed off with a brush and the concrete again wet, after which it is dusted with a mixture of dry sand cement in the proportions of one part of cement to two parts of sand. It is then rubbed into the surface with a coarse No. 16 stone, but care must be taken not to allow any of the mortar to remain on the surface. The final finish is obtained by rubbing the whole surface thoroughly with a No. 30 stone, this finish giving a lighter colored surface than troweling, while at the same time it fills any pores that may be in the cement coating and leaves the masonry more waterproof than it was originally.

Another method of concrete surface treatment involves the removal of a certain part of the concrete wall to expose other parts of it and in this way furnish more life and feeling. By this method either the small aggregate—that is, sand—or the large aggregates together with the smaller ones—namely, the sand and the stone—may be exposed. There is a slight difference in the placing of the concrete, depending upon whether or not the large or small aggregates are to be exposed.

Exposure of Aggregates.

In case the smaller aggregates are to be exposed the concrete should be carefully spaded between the concrete and the surface in the form, as this brings to the surface finish, particles of sand and the cement itself.

In case the larger aggregates are to be exposed no spading should be done, but all the tamping of the concrete should be done in the middle of the wall. This causes the pushing of the larger aggregates (stones) against the surface of the form. In either of these methods the desired color effects come from the color of the sand or the stones used in the concrete. These stones should be very carefully selected, with the ultimate color effect to be obtained constantly in mind. The same selection of aggregate should be used throughout the entire wall, so as to give it a uniform variety of color. If white limestone is used for one batch of concrete and trap rock the next, the wall would be covered with ugly blotches of alternate black and white, and would present a far from pleasing appearance.

The forms should be removed within 24 hr. of the placing of the concrete and the surface scrubbed with an ordinary scrubbing brush or wire brush and water, until all the mortar is removed from the surface of the aggregates and their natural color exposed to the eye.

It very often happens that it is inconvenient to remove the forms in so short a time, and if they are left longer the same results may be obtained by the use of a solution of 1 part muriatic acid to 4 parts of water. If this solution is used, the whole surface should be finally washed down with water to remove any particles of the acid remaining on the concrete.

A very successful method, by which practically any color of surface finish can be obtained, is by the insertion of a metal frame between the concrete and the surface of the form. This can be done in several ways. The one most generally employed with uniform success is to run a line of sheet iron forms, each 12 in. high and 6 ft. long, across the face 1 in. away from the outside forms. (See Fig. 13.) These forms, or "granolithic" plates, as they are called, are held away from the face forms by 1-in. angles riveted vertically on the plate. The plates are allowed to lap each other and several small plates are used to fill out evenly the length of the form. The top 3 in. of the plates are bent backward away from the face to give sufficient room to pour the granolithic mixture between it and the face forms. The concrete and the finishing mixture are poured at the same time, the latter always being kept slightly higher than the former. This prevents any of the concrete itself or cement grout from running between the lap in the plates and down onto the face of the work, as this would disfigure it.

Granolithic Finish.

The granolithic finish is mixed wet and poured from a bucket into its place. As the work proceeds the granolithic plates are raised so that their top edge is always 6 or 8 in. above the concrete. This can be done very easily when the concrete is laid in 6-in. layers. Twenty-four to thirty-six hours after the concrete has been placed the forms are taken down and the surface washed down to remove the sand and cement from beneath the grits, allowing the latter to stand out and present a very good imitation of granite finish. After washing the wall is protected from the sun and wet down twice a day for the next three days or longer, depending on the condition of the weather. In washing down, if the washing is started within 24 hr. of the placing of the concrete and the forms removed so as to expose only about 20 to 30 minutes' work ahead of the scrubbers, then an ordinary bristle scrub brush will work very well, and very rapid work can be done. If, however, the surface is not scrubbed until 36 hr. after the placing, or is allowed to stand several hours after the forms are removed, then the scrubbing becomes very difficult, and it is necessary to use a wire brush and only slow progress can be made. In any case a constant stream of water is kept running down the portion of the surface being washed. Some care has to be exercised to make the scrubbing uniform, as too much or too little pressure on the brush will make considerable difference in the appearance of the finished surface. The scrubbers soon get accustomed to this, however, and learn to vary the pressure with the state of hardness of the surface. Fig. 15 shows how effective this method of finishing a concrete surface can be made.

By varying the mixture of the granolithic finish practically any color and texture can be obtained. By the use of white cement and crushed marble a beautiful white appearance is secured; by the use of ordinary cement and crushed brown stone a dark brown effect is given. Marble flour with ordinary cement gives light gray. Crushed red granite gives a permanent and attractive color.

Coloring Matter.

Coloring matter mixed in mortar is sometimes used to give a uniform color to the entire wall. The cement, sand and coloring matter are mixed together dry, and it is advisable to experiment a little to find how much color is needed to give the desired shade. The mortar will appear several shades darker when wet than after it has dried.

By mixing five pounds of coloring matter with a bag of cement the following colors are obtained:

Raw iron oxide will give bright red.

Roasted iron oxide will give brown.

Ultramarine will give bright blue.

Yellow ochre will give buff to yellow.

Carbon black or lampblack will give gray to dark slate.

Manganese dioxide will give black. (Use 11 pounds per bag of cement.)

A mixture of equal parts of carbon black and red iron ore gives dull reds. In all cases the addition of mineral colors causes a loss of strength, but this is not important, since the color is used only in the surface coat. Lighter shades may be obtained by using one-half to one-third the quantities of coloring matter give above.

The additional expense of coloring a surface layer ¾-in. thick will vary from half a cent to 2 cents per square foot.

It will be seen that any desired color may be obtained by varying the color of the aggregate or by the assistance of mineral coloring matter.

Clay Treatment.

If a treatment of artificially exposed aggregate, sometimes called pebble dash, is desired, the following method may be employed:

Erect forms of rough boards in usual manner, in courses of 3 feet or less. Plaster inside these forms with wet clay. To this wet clay apply different colored pebbles in sizes of ¾ in. down to those that will be retained on ¼-in. screen. The pebbles will stick to the clay. Pour in the concrete and remove the forms in the usual time, and after the concrete has become thoroughly set wash off clay with a hose, scrubbing slightly with a brush. The clay will tint the concrete and the pebbles will give a pleasing color effect.

Any colored pebbles desired may be used in this way, and in a number of places pieces of broken glass have been embedded in the concrete.

Bush Hammering.

For wall work the surface is sometimes picked with a pointed or toothed tool. This chips off the mortar which may have flushed to the surface and cuts away little particles of the mortar from the aggregate below. The roughening of the surface breaks up the light, gives a lighter, snappier color to the mortar itself, and besides this exposes the color of the aggregate below. Oftentimes where gravel is used the stones show rusting and have various shades of browns and reds. This additional color on the concrete adds a great deal to its appearance, and when the dressing is carefully done it gives as pleasing a surface as can be obtained economically. The dressing removes most of the traces of the form and does away with inequalities which may occur in the work.

The objection to this kind of dressing comes in the removal of the surface mortar, which is the most waterproof part of the concrete. If there is any tendency toward porosity in the mass of concrete, it will absorb more moisture after the dressing than before it, and will accentuate the injury from frost. On well handled and properly proportioned concrete there is, however, very little danger from this, as the material is of itself very dense and waterproof. The fence around Soldiers' Field in Cambridge, in 1899, was treated in this way. It is in low land along the river, where it is fairly damp. This wall is exposed fully to the weather and is in thin sections, but there is no surface deterioration from the weathering.

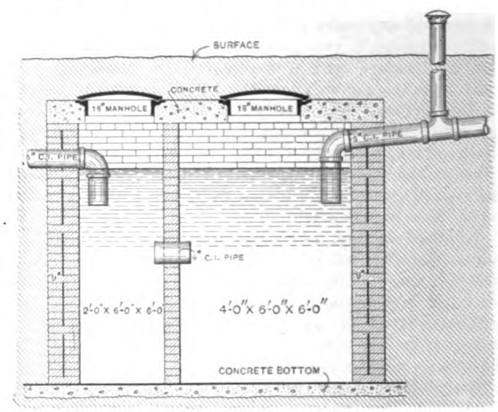
This rough picking shows the masonry honestly as concrete, without any imitation of other material. It gives a pleasing surface and one that can well be used on building work. A fairly good Boston example of this dressing is the little subway station on State street, near Atlantic avenue. A comparison of the appearance of this dressing and of stone surface is readily afforded by the other subway stations. A laborer with a handpick will dress from 40 to 50 ft. of concrete surface two to three weeks old in a day. With a pneumatic tool laborers will get over 50 to 60 ft. There is but the slightest difference between the work of the hand tool and the machine tool. The depth of the cutting and the fineness of it can, of course, be varied to suit the conditions. This is the surface that the architects use generally for their landscape and other ornamental work. From the point of economy as well as good looks, this dressing for wall surfaces deserves attention.

Two methods of bush hammering have been successfully used in the preparation of concrete surfaces, viz., hand hammering and hammering with an air tool.

In hand hammering the concrete should be allowed to stand at least three weeks after placing, and the longer time given it, up to three months, the more artistic will be the result of the surface. This is due to the crystallization of the cement. In three months it becomes practically as hard as the stone going to form the larger aggregate, and the stone, as well as the cement, is broken by the bush hammer, thus giving life to the surface. In case the concrete is left for longer than three months, the bush hammering becomes very difficult, as the concrete gets so hard that hand hammering has very little or no effect upon it. Various weights and sizes of hammer have been used. A 9-lb. hammer with 32 points on one end and 25 points on the other, and also the same weight hammer with 25 points on one end and 16 points on the other, have given good success. The tendency, however, seems to be toward having a lesser number of points with a lighter hammer.

A Nashville Septic Tank.

The advantage which the septic tank possesses for the treatment of sewage so as to make it harmless is sure to extend its use and popularity. The accompanying illustration shows a septic tank that has been in use for the last two years in Nashville, Tenn., and in



Sectional View of Septic Tank in Use in Nashville, Tenn.

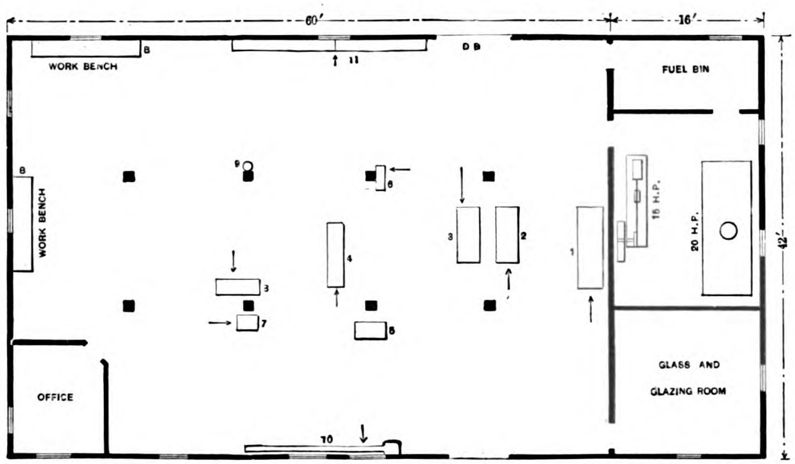
reference to it Plumbing Inspector J. T. Fox, who is a member of the American Society of Inspectors of Plumbing and Sanitary Engineers, says that it was built to take care of the waste from a family of ten persons. From the dimensions it is easy to calculate that the receiving tank has a capacity of 144 cu. ft., or 1065 gal., while the discharge tank has a capacity of 72 cu. ft., or 532 gal., giving the two tanks a capacity of 160 cu. ft. for each person. Mr. Fox also points out that the tanks should have a capacity of 21.6 cu. ft., or 160 gal., for each additional person up to 40 people. Where the tank must take care of the sewage for a larger number of persons, however, it is necessary to provide a filtration bed in connection with it. The tank in question, without the use of any special filtration bed, has been in service for a period of two years without complaint.

THE Campanile of St. Mark's has now reached such a hight as to make an almost startling object lesson on the terribly prosaic state or hardness, tightness, smoothness, novelty and rigid repair in which the ages of antiquity possessed the buildings we hold venerable, says the London *Chronicle*. It is a perfect facsimile of the original belfry tower of which the fall gave a shock to all hearts, it continues, and that beautiful tower, before it fell, had a surface, a sweetness, an imperceptible disintegration which was the bloom of time. A random touch of green lodged between its bricks, thanks to the birds or the winds. Its successor is an almost hideous disappointment, and looks like nothing but a part of some monstrous factory."

PLAN FOR A SMALL WOODWORKING SHOP.

THE arrangement of a small woodworking shop with the machines so disposed as to most economically handle the materials is a matter of never ending interest to carpenters and builders generally, and especially to those who conduct a business on a sufficient scale to require the use of a few woodworking machines operated by a gas or gasoline engine or other small power. A number of plans of small woodworking establishments have appeared in the past in the *Woodworker*, and we present herewith one of the more recent showing the arrangement of a small mill of the character indicated. The matter is furnished by an Indiana correspondent of that journal, who sends in connection with the accompanying plan the following particulars:

This mill is 42 x 76 ft. on the ground and 14 ft. to the eaves. The posts running through the center of the building are 6 x 8 and 12 ft. apart each way, leaving 15 ft. on each side from posts to outside wall; these lowers instead of the table, and is supplied with a groover for grooving and gaining window jambs, &c. The table tilts to any angle to 45 degrees, making it very handy for making bevel siding or any kind of bevel sawing. When ripping the lumber is brought in through the double doors marked D D, run through the saw in the direction indicated by the arrow, and left in good position to run through either the planer or sticker. Four is a universal woodworker. This machine is used for any kind of jointing, beveling, planing out of wind, molding, grooving, gaining, rabbeting, raising panels, &c. It also has a boring attachment, which is a very good one, and carries bits from ¼ to 1½ in. As the mandrels of this woodworker and the rip saw are of the same size, the gaining and grooving head can be used on either machine; so when making frames, if the woodworker is in use, the rip saw is used, or *vice versa*. Five is a single spindle shaper. Six is a No. 2 mortiser. Seven is a 34-in. band saw. Eight is a tenoning machine. Nine is an arm sandpapering machine suspended on the post; the bench that is used to sandpaper on is also used as a frame bench; it sets on large casters and can be moved into any position in the mill. When the sand wheel is not in use it is folded up against the post and



No. 1 is a 7-in. Sticker; 2 is a Single Planer; 3 is a Rip Saw; 4 is a Universal Woodworker; 5 is a Single-Spindle Shaper; 6 is a No. 2 Mortiser; 7 is a Band Saw; 8 is a Tenoning Machine; 9 is a Sandpapering Machine; 10 is a 16-in. Turning Lathe; 11 is a Swing Cut-off Saw.

Plan for a Small Woodworking Shop.—Scale, 1-16 In. to the Foot.

posts are well braced from one to the other, as they support the roof as well as the 2⅜-in. line shaft, which is hung overhead on post hangers. The outside walls are of 2 x 4 studding, lined outside with building paper and 8-in. drop swing; on the inside with paper and 8-in. flooring, tongued and grooved, of course. The lower joists are of 2 x 10 and 12 in. apart, and well bridged. The upper joists are of 2 x 8 and 18 in. apart. These joists also form the rafters. The roof is ship lap covered with tar and gravel, with a pitch of 1 in. to 1 ft. The office is 10 x 12 ft., with door on inner corner entering the mill. The fuel room is 8 x 16 ft., boiler and engine room 16 x 20 ft., and glass and glazing room 14 x 16 ft.

Referring to the figures on the plan, 1 is a first-class four-sided 7-in. sticker, belted direct from the line shaft above; 2 is a good 24-in. double belted single planer; it is belted from line shaft to countershaft, which hangs overhead, and belted from there to the planer. As the planer and sticker take more power than any of the other machines, they are placed near the engine. They also make more shavings, which are thrown very near the boiler room door, making it convenient for firing. Three is a left hand rip saw. The arbor raises and takes up very little room. This machine has a blower attachment, which blows practically all the dust through a tin pipe to the outside of mill. Ten is a 16-in. turning lathe. Eleven is a swing cut-off saw. The work benches are indicated at B B, each being placed beneath a window so as to give plenty of light.

The mill is run with a 20-hp. boiler and a 15-hp. engine. The engine is well taken care of and gives all the power that is needed. The steam plant was put in instead of a gas engine on account of supplying the heater pipes and dry kiln with steam. It takes very little coal in addition to the refuse from the mill, hence it costs very little if any more than a gas engine for power. The engineer keeps the mill clean at all times, and does the oiling of the machinery and line shaft. The exhaust steam is used in heating the mill and dry kiln.

STUCCO has long been popular in European house construction, and now polished granite veneered fronts are coming into favor for city residences, as well as for business buildings. Not that cold prison-like granite of other days, but handsome new stones, some of them of almost brilliant coloring.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - TREASURER
GEO. W. COPE, - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

SEPTEMBER, 1909.

Meetings of Trade School Teachers.

The example set by England is an excellent one in having the teachers in the trade schools meet annually to compare experiences and derive such benefit as comes from an exchange of ideas as to the best methods of bringing home to young students of all grades of education and intelligence the governing facts in reference to the trades, as well as the best ways of teaching the handicrafts. As yet those who are interested in trade school work in the United States have learned only of what other schools are doing by incidental visits to these schools or through some visitor from another school visiting them in search of such information as could be secured through personal observation and conference. It is a notable fact that for years those who have had in contemplation the establishment of schools for teaching any one of the building trades have made it a point to visit the New York Trade School, which was the pioneer in this field of education in the United States. Doubtless the season now practically at hand, which for night classes this year opens on September 27, will prove no exception, and many visitors from other trade schools will make it a point while in New York to visit this establishment. However, in the last few years schools devoted to technical training have sprung up in a number of different centers, and there can be no doubt that if arrangements were made whereby those who take a leading part in the instruction could meet during the vacation season an explanation of the plans followed by the different representatives would result in the spreading of much valuable information. It is rather late for a movement to such an end to be carried out this year, but certainly if it has been found beneficial for such instructors to meet in England the distance which separates trade schools in the United States should not prevent those who bear the responsibility of giving trade instruction to young men from meeting at some common point and carrying out a programme which could be devised in advance for mutual and general benefit.

Cooling the Air in Buildings.

A matter which now and then has received the serious consideration of the house owner is the desirability of cooling the various rooms of his home, and since artificial means of lowering the temperature have been found practicable by means of a circulation of brine through coils, the possibility of using the radiators of an ordinary home for cooling it during the hot months of the summer season is frequently mentioned. Experiments have demonstrated the fact that artificial cooling has the important effect of reducing the absolute humidity, and as the latter is one of the great sources of discomfort in summer in many sections of the country, especially in some of the larger cities along the seacoast, this partial elimination results in greater comfort to the occupants of the building without necessarily lowering the temperature to some particular level. It is interesting to note that the comfortable temperature varies in hight somewhat in accordance with the outside temperature, so that the load on the cooling apparatus does not become intensely heavy on an unbearably hot, sultry day. Another fact worthy of note and serious consideration is that in one establishment which has been artificially cooled during the hot weather for the past two years the records show that the health of all who are engaged in the building has been improved. Apparently this is due to the fact that those who occupy the cool building do not have to withstand so exhausting a strain on their vitality as those who have to meet the summer weather conditions as they are found. This latter point is a most important one, and doubtless if experience generally substantiates it there will be an argument of vital strength for use in the sale of cooling apparatus and the engineers can recommend such equipment with more vigor than heretofore. Cooling equipment exists in a number of cities and in a number of buildings, so that observation and records on various points can be made for guidance. In one notable instance where the better health of the occupants of a building has resulted other tenants of the same building have asked for similar service, being willing to pay more for the cooling than they pay for the heating. So far as the general contractor is concerned, the equipment of buildings with cooling devices is a new field, and architects need to give more than a casual study to it in order to provide in their constructions for this vitality preserving, health supporting property of the air supplied for ventilation during the summer season. Such equipment naturally provides for a large air supply, and to keep it and the temperature under control windows are not opened, and consequently outside dust and dirt is avoided, the air supply being washed as well as cooled and thus another menace to health is overcome.

Newark's New Theater.

One of the most important additions to the architecture of the city and at the same time probably the finest structure of its kind in the country will be the theater, office building and roof garden, which is being erected on Market street, Newark, N. J., at a cost which is estimated to closely approximate $1,000,000. The new building will cover 17,000 sq. ft., of area, will be five stories in hight, and have 40 offices on the street side above the ground floor. Cantilever construction throughout will do away with the necessity of supporting pillars, and steel and concrete will be the predominating materials in rendering the building fireproof. The interior decorations will be in the style of Louis XV., with a painting over the proscenium arch depicting the "Fall of Rome." The entrance lobbies, 31 x 116 ft. in size, will be in Sienna marble with mosaic tiled floor. Opening upon the lobby will be smoking and retiring rooms, and from it will run two large passenger elevators for the accommodation of those who have seats above the ground floor. The main staircase, also of Sienna marble, will lead to all the balconies and to the roof garden. The latter, arranged with glass covering, will extend over the entire building. A feature will be a miniature Venice with gondolas and real water. There will be 36 exits, steel fire escapes, high pressure standpipes and a lighting system involving 2400 incandescent lamps for the outside illumination alone. The drawings were prepared by Architect William E. Lehman, who states that accommodations for seating more than 2000 people will be provided.

Carpenters' Wages 100 Years Ago.

A little handbook published a little more than 100 years ago, or, to be exact, in 1800, to furnish local house builders with a means of handy reference in setting prices on almost every conceivable kind of carpentry work has recently been discovered in the store of a Boston dealer in rare old books. It is entitled "The Rules of Work of Carpenters in the Town of Boston," and gives a striking demonstration of the great changes that have taken place in a little more than 100 years in the methods of turning out woodwork used in house building as well as in the cost of it. The preface shows that the little handbook was practically a revision of an earlier one published in 1774 by Boston carpenters, and that even before the Revolution master builders had so good an understanding one with another that they were agreed on the prices to be charged for various kinds of work.

The rules and prices of 1800 were professedly prepared by a committee of 21 of the master carpenters of Boston with a view to having a price scale "bearing a proper proportion to the price of other branches of labor" at that time and with a due regard to the increased cost of living that had come about since the Revolution.

The prices given in the little book appear to include the cost of the lumber to be used in the work estimated on, and are frequently figured on the "per square" basis. Here are some of the prices given in the "Rules of Work":

Framing floors with summers or planks, 10 to 12 in. deep, per square, $1.33; framing a pitched roof, rafters 8 in. deep, per square, $1.50; rough boarding, per square, 50 cents; window frames for 24 panes of 6 x 8 glass, $1.25; raising house frames and putting on roofs and floors, to be paid by the day.

Sashes up to 8 x 10 glass, per light, 6 cents; laying shingles, per square, $1.50; ripping up shingles and clearing the nails, per square, 33 cents; water tables of plank, 6 inches wide or under, per foot, 6 cents.

Outside doorcases of plank for brick walls, per superficial foot, 8 cents; inside doorcases with framed head, 95 cents; cellar doors with head, fills and strings, slanted to the house. $3; rough plank partition, solid, per square, $1.25; rough furring and ceiling, per square, $1; partitions of boards planed on both sides, matched, per superficial foot, 4½ cents.

Single face architrave, running foot, 6 cents; double face, 10 cents; inside window shutters of planed boards, ends cleated, running foot, 8 cents; planed plank stairs, straight run, per step, 42 cents; if winding stairs, 60 cents.

Wainscoting rooms from floor to ceiling with quarter round work, superficial foot, 8 cents; wainscoting up to the windows, quarter round work, superficial foot, 10 cents; plain risers and returns for window seats, superficial foot, 11 cents; the same, with panels and quarter round work, 15 cents; eight-paneled door, quarter round work, one side, per superficial foot, 15 cents; same, two sides, 20 cents; putting on mortise locks, 75 cents each.

Casing kitchen chimney with shelf and single cornice, per shelf, $1.50; plain chimney casings, 75 cents; floors of merchantable boards, not planed to a thickness, per square, $2; if rabbeted, $2.25; if planed to a thickness, $2.75. If laid with narrow boards of the best sort, per square, $3.50; plain picket fence, running foot, 25 cents; window blinds, for 24 square, or less, of 8 x 10 glass, in two parts, per window, $1.25.

A comparison of the above figures with current rates shows the latter in most cases to be at least double what they were in 1800. In a very few instances, such as window sashes and blinds, for example, the cost is lower to-day, a fact due to their being turned out now by machinery so much quicker than they used to be by hand. The greater cost of carpentering to-day is mainly due to increased wages and shorter hours that have largely come about during the last 30 years.

Officers National Lumber Manufacturers' Association.

The seventh annual session of the National Lumber Manufacturers' Association was held at the House of Hoo-Hoo on the grounds of the Alaska-Yukon-Pacific Exposition at Seattle, July 12, 13 and 14, and will go down in the history of the organization as one of the most successful as well as the most enjoyable conventions it ever held. There were over 200 in attendance at the beginning of the session, representing all points of the compass. The officers elected for the ensuing year are as follows:

President, Edward Hines, Chicago, Ill.

First Vice-President, E. G. Griggs, Tacoma, Wash.

Second Vice-President, W. B. Stillwell, Savannah, Ga.

Treasurer, J. A. Freeman, St. Louis, Mo.

Secretary, George K. Smith, St. Louis, Mo.

A Board of Governors was elected, consisting of members representing the States of Virginia, Missouri, Wisconsin, Mississippi, Idaho, Washington, Louisiana and Georgia.

It was decided to hold the next annual meeting in 1910 in the city of New Orleans, La.

Plumbing Supplies in Brazil.

Concerning the use of sanitary and plumbing goods in Rio de Janiero, Consul-General George E. Anderson, writing from that city, says:

There is a growing demand here for the latest sanitary fittings and plumbing supplies, and all things which go to make up a modern equipment in bathrooms, both public and private. Nearly all of Rio de Janeiro city proper is now piped for the most modern sewerage service, and full provision is made therein for modern plumbing. There are large districts in the outlying suburbs to be improved in a similar way, so that the business is likely to grow considerably in the near future. The sewerage and water connections are given unusually thorough inspection, as is necessary in a city which has gained so much from the introduction of modern sanitary methods and appliances. On the whole, fittings for water connections run lighter in weight than in the United States, owing to the fact that the water pressure generally is low, and also to the fact that frost is never to be considered.

From the introduction of the first modern sewer system by an English corporation until comparatively recently English merchants were generally in the lead in such matters, and most of the imports of such goods are English, while to some extent fashion favors English ware. The United States, Germany and Belgium, in the order named, however, have a fair share of the trade. American fittings and appliances seem to be popular and apparently there is a good opportunity to extend the trade. There is an increasing use of enameled iron bowls, baths and uninclosed washstands. In short, the business is becoming more and more progressive and is open to the most modern supplies.

SOME time ago we referred in these columns to the first seven-story nonelevator tenement house projected for erection in Greater New York since the new Tenement House law went into effect in 1901, and now the plans have been filed for the second building of this type in what is known as the original "Little Italy" colony in Thompson street. The building will have a frontage of 50 ft. and a depth of 100 ft., and will contain 45 suites of apartments, with stores on the ground floor. It will be of gray brick trimmed with terra cotta and have a Spanish roof of Moravian tiling. The windows will be of modified Colonial pattern.

CORRESPONDENCE.

Addresses of Correspondents Wanted.

If the correspondent who made inquiry under recent date as to architects' charges and superintendence, the style of drawings to be furnished, &c., and inclosed stamp for reply by letter, yet failed to give either his name or address, will send us the necessary particulars we will take pleasure in furnishing the information desired.

We shall also be glad to give attention to the communication of the correspondent signing himself "S. F. T." if he will supply full name and address.

In this connection we would emphasize what has frequently been published in this department—namely, that every correspondent should sign his letters with full name and street address, so that in case of necessity the editor may communicate with him. All communications, however, are published under the initials of the writers unless otherwise requested.

Weatherboarding a Circular Bay Window.

From C. J. M., St. Johns, Newfoundland.—In answer to the inquiry of "M. C. H.," Atlantic City, N. J., in the July issue, in regard to applying siding to a circular tower or bay window, I would say if the correspondent means featheredged siding or clapboards, the geometrical method of doing the work is to consider each course of siding as a segment of the frustrum of a cone, the axis of which is a line drawn vertically from the center, from which the circle of the window is described and the apex of which is found by continuing the line of the face of the siding to meet the axis. This last mentioned line is the radius by which to describe the curve which the siding will require in order to coincide with a level line when bent around the circular surface of the window. What is meant is more clearly indicated in Fig. 1 of the sketches, in which the semicircle A B C represents the plan of the window, the lines A E and C D being its sides in elevation. A section of one course of siding is shown at *a b* and the line of its face continued to meet the axial line F G drawn from the center F in the point G.

Now with this radius the curves *b c* and *a d* are described, which are the proper curves for both edges of the siding.

Although the above is the proper geometrical solution of the problem, it is not always the most convenient method of doing the work under consideration on account of the great length of trammel rod required when the circle of the plan is large. There is, however, another way of doing the work, which may be called a "handyman's method." No person, however, need be ashamed to use it, as it is a regular mechanical method, being really an adaptation of that practiced by boat builders in obtaining the curves of their plank.

After the baseboard is set in place, which being of a parallel thickness will bend to a level line, take a piece of siding, say 6 ft. long and tack along under the thick edge of it a strip equal in thickness to the under lap of the siding, as indicated in the section, Fig. 2. Find the center of the piece of siding and square a pencil mark across it. Now bend it around the window, as shown in Fig. 3, in such a manner that both its lower corners will touch the upper edge of the baseboard. It will now be seen that the center of the piece of siding rises above the edge of the baseboard. Take now the distance that it is off the baseboard at the center marked on the piece of siding, in the compasses, and while keeping one leg on the baseboard prick along the siding with the other point, thus making a series of points or dots in the required course which may be swept with a thin batten and cut to fit. This piece may then be kept for a mold by which to cut all the other boards.

It should be borne in mind, however, that the circle of the window must be a large one to admit of its being covered with straight lap siding. A piece of siding less than 6 ft. long is not convenient for bending, and the curve of the wall should be such that when a piece of this length is bent around it will not rise more than ½ in. off a level line in the center. In cutting it to the curve when it rises more than ½ in. the difference in thickness between the ends will become too great on account of cutting toward the thin edge of the board and there will always be a hollow at the butts.

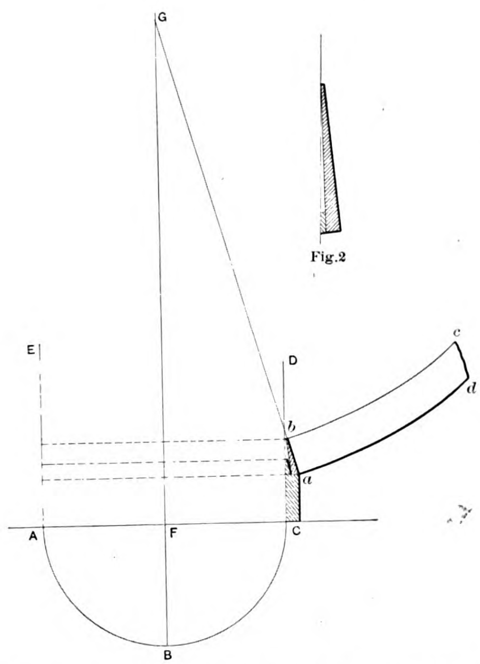


Fig. 1.—Geometrical Method of Finding the Curve of Lap Siding for Circular Bay Window.
Fig. 2.—Section of Siding Prepared for Bending Around Window.

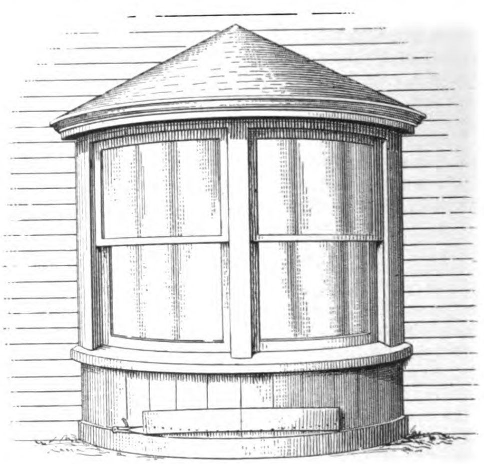


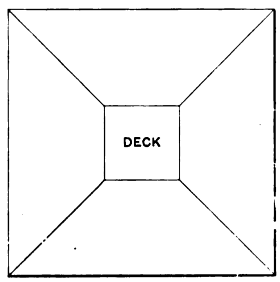
Fig. 3.—Bay Window, Showing Method of Obtaining the Curve of the Siding.

Weatherboarding a Circular Bay Window.

Remodeling a Hip Roof with Deck.

From H. W. S., Sioux Falls, S. D.—I would like to have some of my brother chips who read the columns of the Correspondence Department help me in planning a roof for my house. I am like a doctor when sick and wants some other doctor to cure him. My house is 24 ft. square, with a diamond (hipped) roof with a deck as shown in Fig. 1 of the sketches. The pitch is about 6½ in. to the foot.

Why I want to change the roof is on account of the windows in the second story. The outside wall posts are 14 ft. high, and it will be seen from Fig. 2 of my sketches that the windows now come down almost to the floor and are very short or low. What I want is to



Remodeling a Hip Roof with Deck.—Fig. 1.—Plan of Roof.

have the bottom of the window up more from the floor and the window taller, no matter if it is necessary to put on dormers or small gables. An idea of the present arrangement of the rooms on the second floor may be gained from the plan, Fig. 3. The two front chambers are 18 ft. 10 in. by 12 ft., while the rear chambers are 11 ft. 6 in. by 12 ft. The hall is 2 ft. 5 in. wide. I would say that the house stands about 3 ft. above the ground.

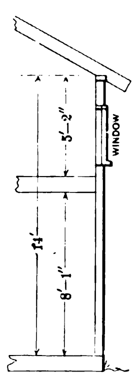


Fig. 2.—Section Showing Position of Second-Story Window.

If some of the practical readers will help me out of my trouble I shall greatly appreciate it.

What Is "Chittimwood"?

From C. J. W., Norfolk, Va.—Apropos of "A Hardwood Curiosity," upon page 283 of the August issue of *Carpentry and Building*, I am sending a verbatim copy of an item taken from "The American Lumberman's Curiosity Shop," in which the account hardly agrees with the Government forestry expert as quoted:

CHITTIMWOOD.

What is Chittimwood, and where does it grow? The Chittim tree, *Bumelia Lanuginosa*, abounds in eastern Tennessee and western North Carolina, although occasionally it is found as far south as southern Kentucky, as far south as Florida and Alabama and west to Illinois and Missouri, reaching its largest size in eastern Texas. It is also called Chattamwood, bellwood, shittimwood and peawood. A considerable portion of it is burley. The wood is reddish yellow in color and runs largely to heart. The tree grows to a considerable hight and runs from 18 to 50 in. in diameter. The wood is of practically the same density as red birch, averaging 32 lb. per cubic foot. The grain is somewhat involved—(*i. e.*, one part running one way, the next streak running the other way.

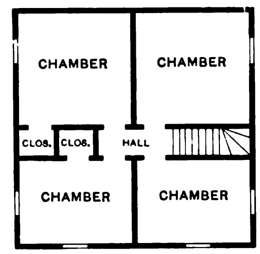


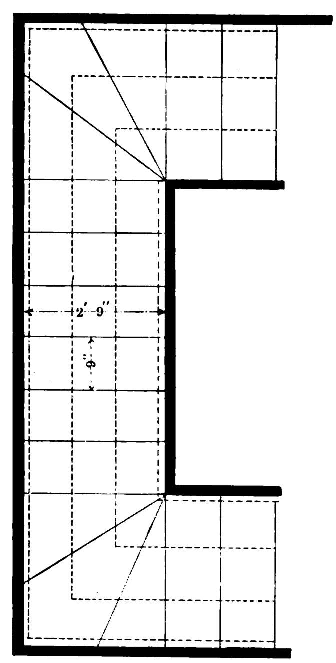
Fig. 3.—Plan of Second Floor.

—*C. J. W.*) and usually is of splendid figure. Because of its limited growth Chittimwood is but little known.

Constructing Stair Carriages.

From W. E. G., Felton, Del.—I am sending a rough sketch of a stairway having 16 steps supported by 2 x 12 in. carriages spaced 11 in. on centers and built between walls, with a door on the second step. What I am desirous of ascertaining is the manner of constructing the carriages, particularly where the quarter winds are supported. The dotted lines on the sketch indicate the carriages. The risers of the stairs are 7 in. and the treads 9 in.

Will some of the craft who have had actual experience



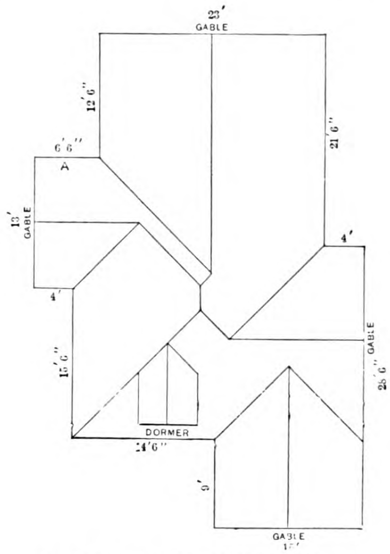
Constructing Stair Carriages.

in this class of work kindly respond and oblige an interested reader of the paper.

Roof Plan for Dwelling.

From M. C. W., San Jose, Cal.—The way in which "M. L. N." in the July issue fixed up that roof problem of "G. W. G." struck me as being just about right. That small gable at the left side gives it an individuality that is good. I think, however, it would be an improvement to hip the wing to the rear.

I would suggest to my brother chips that they avoid such complexity of plans as would call for such problems. A more convenient arrangement of rooms can be secured



Roof Plan for "W. V. W.'s" House.
Fig. 1.—Solution Offered by "F. J. K."

by avoiding so many angles, and again it is much cheaper.

Plans for "W. V. W.'s" Dwelling.

From F. J. K., McKeesport, Pa.—In answer to the request of "W. V. W.," Scottsburg, Ind., I am sending sketch of roof, Fig. 1, for the building of which the floor plan is given in the June issue of the paper. I desire at the outset, however, to call the attention of the correspondent to the fact that his figures of width at the rear of the building do not correspond with the width at the front. The offset at "A" is marked 7 ft. on his sketch and it should be only 6 ft. 6 in.

From J. W. N., St. Louis, Mo.—I am sending a blue print, Fig. 2, showing my method of roofing the floor plan

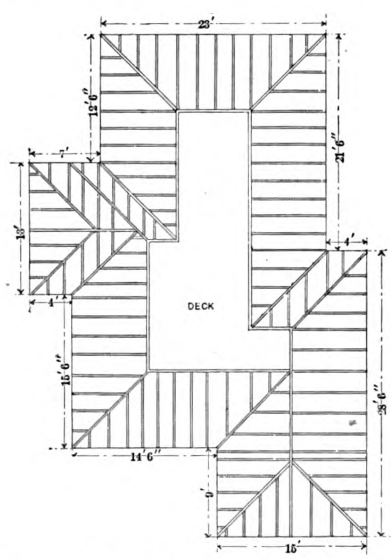


Fig. 2.—Framing Plan Submitted by "J. W. N."

submitted by "W. V. W.," Scottsburg, Ind., and published in the June issue of the paper. The frame work can be made any pitch desired by changing the size of the deck. The plan which I send represents the framing when the roof is to be shingled. The correspondent could also run hip rafters up to the ridge and do away with the deck if he so desired.

From E. F. C., Bremen, Ind.—I have been a constant reader of your valuable magazine for a number of years and I find it of great benefit to me, especially the Correspondence columns, from which I glean many a hint that is of practical value. I am contributing a roof plan herewith, Fig. 3, in reply to the query of "W. V. W.," Scottsburg, Ind., who will note that the roof consists of hips, valleys and gables. I rather think it looks best with only three gables, although it could be constructed with four.

He did not state as to his plate line whether it was the same hight throughout the entire building or not, but I took it for granted that it was and made the plan accordingly.

Design Wanted for a Water Tank.

From A. G. W., Seattle, Wash.—I would like to have some of my brother carpenters give through the Correspondence columns their ideas for building a water tank

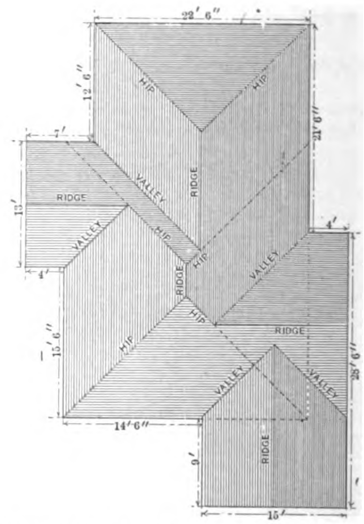


Fig. 3.—Plan Accompanying Letter of "E. F. C."

which is to be filled by means of a hydraulic ram. The tank is for the purpose of supplying a house with running water and should be about 800 gal. capacity, as I wish to use some of the water for irrigating purposes. The tank must not be cylindrical in shape.

I have been a reader of *Carpentry and Building* for about two years and find many valuable things in its columns.

Strength of Ropes, Blocks, Etc.

From W. S., Paterson, N. J.—I have been very much interested in the recent articles in *Carpentry and Building* on "System in the Execution of Building Contracts," and would like to suggest contributions on another topic which may possibly appeal to many other readers besides myself. What I have in mind is an article or articles on the strength of ropes, blocks, &c., telling for instance how much more can be raised with double than with single blocks and how much more with triple than with double blocks, and so on.

Details of Painter's Scaffold.

From I. G. Bayley, Haddonfield, N. J.—My attention has been called to the criticism by "L. G.," Los Angeles, Cal., of my scaffold article. I would say that the correspondent's idea of putting spikes in the bottom of the ladder may be all right provided he keeps his feet out of the way of them. The sketches as sent in represented the scaffold exactly as it was used by the painter and no mishap or any other trouble occurred, so I assume it must have been satisfactory for the purpose.

Construction, Piping and Heating of Small Drying Kiln.

From P. A., New Britain, Conn.—Being a subscriber to your valuable paper for the last five or six years, I come to the Correspondence columns for a little information on the construction, piping and heating of a small drying kiln, in size 11 x 20 ft., with 8-ft. posts. The kiln is to be heated by means of a sectional boiler to carry about 7 lb. of steam.

Answer.—The above query was submitted to one who has had a long and varied experience in connection with the conduct of planing mills and general woodworking shops and he furnishes the following comments in reply thereto:

The building should be constructed as nearly air tight as can be, so as to control the heat. I would cover it tight on the outside and put in paper between the studing with strips of wood so as to make an air space, as it will be less affected by frost in winter. I would have a good ventilator in the roof with trap door inside, so it can be closed tight when desired. Then I would have a number of ventilators all around the building at the bottom below the piping which can be opened or closed according as circumstances may require. There should be a door at each end of the building on a level with the slat floor, so that lumber could be passed in and out at either end. This arrangement I have thought much better than having one door, but of course this is a matter of convenience and not an absolute necessity.

Now there are a great many notions with regard to dry kilns and their management, and different kinds of lumber and circumstances go a long way in their successful operation. In connection with green lumber from the log, fresh cut, I have seen the water drip from the ceiling and the only way we were able to dry anything was to have good ventilation in the roof, and this takes lots of steam to operate. Recently I was in a plant for getting out green stock and kiln drying where the upper part of the mill was used as a dry kiln with piping between the floor joist. The ceiling below was taken off and it was all open below, with no ventilation at the top. The proprietor told me it was the most successful way of drying stock he had ever used, and he had tried about every method. Now for air dried lumber that has been on sticks, it needs no ventilation at the top to work well.

The sketches which I send show a building so planned that the correspondent can use his judgment according to conditions and circumstances, making use of any method he likes or which ever way works the best on the kind of stock he is drying. The ventilator at the bottom can be opened and the top closed to get the same effect I mentioned in connection with the plant where it was in the upper part of the mill. By constructing the kiln that way the correspondent will have all methods of drying in use, as the ventilator can be closed at the bottom and opened at the top or *vice versa*, or he can close them tight at both top and bottom.

From an inspection of the sketches the correspondent will see the scheme of heating and piping for the dry kiln as I should make it. Very much depends on the lay of the land as well as upon other local conditions. I have planned the kiln on the presumption that the ground is level. If it is sloping so much the better, as he can easily get a basement, which is desirable owing to the fact that the boiler should set below the piping in order to return the drip. Much will also depend upon what kind of material is to be treated, whether green lumber or air dried. I will therefore explain the sketches and the correspondent can build accordingly.

He will see that I have located the boiler in an excavated place or basement so as to get a return drip from the pipes. I present two schemes, that indicated in Fig. 1 showing the pipes above the sills of the building with the slat floor above. The slat floor should be in sections and readily movable. In Fig. 2 the piping is below the sill in a space lined with concrete, so as to render it tight. This plan is the one I should prefer if circumstances permitted, as it will give more room above and be more out of the way, but the space for the boiler will have to be excavated deeper. On the ground plan, Fig. 3, I have indicated the piping arrangement, but I would suggest that the correspondent use as many lines of pipe as can be placed in the space beneath the floor. The piping should not be less than 1¼ in. in size, although 1½ in. would give more radiation. With as low as 7 lb. pressure the correspondent will need all the radiation he can get.

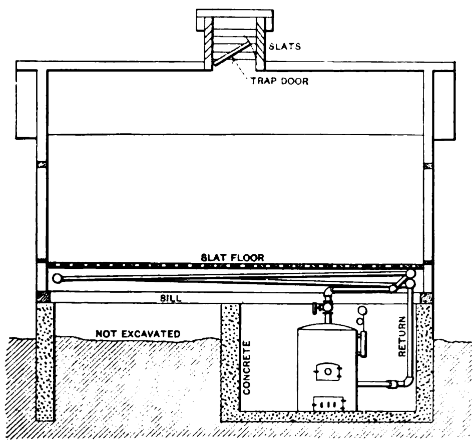


Fig. 1.—Vertical Cross Section of Kiln, Showing General Arrangement.

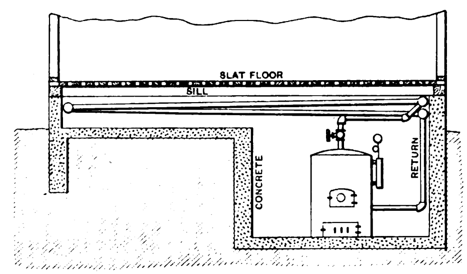


Fig. 2.—Scheme of Heating Arrangement Recommended.

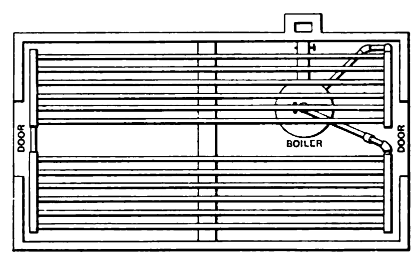


Fig. 3.—Ground Plan, Showing Piping.

Construction, Piping and Heating of a Small Drying Kiln.

The Need for Competent Mechanics.

From Charles J. Woodsend, Norfolk, Va.—The comments appearing in the August issue of the paper under the title "The Need for Competent Mechanics" and reprinted from the *Painters' Magazine* apply with equal force, in my estimation, to carpenters. There are few contractors, to my knowledge, who endeavor to obtain their work so as to keep their crews with them for any length of time. It has always seemed to me that men would strive better to be more competent mechanics if they saw a probability of their being able to retain a situation for any considerable length of time. As it is, they work with one man or firm for a few days or weeks at the most, then they are obliged to hunt around for another job, possibly working for three or four different people within the short space of a year.

I should very much like to see in the trade better and more satisfied mechanics—satisfied that their business is one of the noblest in the whole category, but not satisfied to settle down to a humdrum life. Probably the more the matter is agitated and brought to the attention of those practically engaged in the trade the more there may be an inclination to strive for better results on the part of all concerned, and I should be very glad to see in the Correspondence columns an expression of views from contractors and workmen alike.

An Appreciative Reader of Carpentry and Building.

From R. W. M., Uniontown, Pa.—I have been rather a long time in writing, but better late than never, so I want to take up a little more of the valuable space in the correspondence department to express my thanks for the very satisfactory explanation by Mr. Kittredge of the principles of shading mechanical drawings. He has certainly made this subject clear and no one could fail to understand the plain terms in which he has explained it.

This is one of the many places where I consider that a person gets his money's worth when he ships in that "case note" for a year's subscription to "our paper." Taking my question as an example, it would have been much easier to have replied that

> to represent a curved surface it is necessary to make use of shade lines, varying from heavy to light, according to the curve to be represented.

all of which would have been quite true, but rather unsatisfactory. All the same, I have received plenty of explanations like that, though not through *Carpentry and Building*. Mr. Kittredge's reply, however, has given me so clear an idea of the principles governing the subject indicated that I do not expect to have any further trouble in representing ordinary concave or convex surfaces on a drawing.

I also wish to thank the correspondents "M. D. S." and "J. L." for their methods of hinging and raising heavy poles. Either of the methods shown will meet my requirements nicely, and I will likely make use of one or the other next spring.

A Co-Laborer with "X. Y. Z."

From A. M., Washington, D. C.—It was almost like meeting with a dear old friend after many years' separation to read "X. Y. Z.'s" communication in a recent number of *Carpentry and Building*. It recalled to my memory the many pleasant evenings I spent in the early '80s taking part in the discussions in the Correspondence Department and in the competitions conducted by the paper. I remember "X. Y. Z.'s" letters, also the controversy between "W. B." (Wood Butcher) of Springfield, Mass., and "G. H. H." of Philadelphia, Pa.

I remember the writers whose initials "X. Y. Z." mentions, and also the humorous letters of Andrew Doremus and "H. McG.," whose communications enlivened the pages of *Carpentry and Building* and helped to pass away many happy hours. I have often thought of the old chips—what has become of them?—how many are now living?

I am one of the early, perhaps the earliest living subscriber to *Carpentry and Building*, as I sent in my subscription to the paper in February or March, 1879, to begin with the January number. Certainly there are not many living to beat that record. I have not lost a single number of the paper and look with pride upon my 30 bound volumes.

I have not for years had the time to take part in the correspondence, but I always manage to find time to read that department of the paper, and I advise the younger members of the craft not only to read but to study it. I consider those early subscriptions to *Carpentry and Building* among the best investments I ever made. In those early days I hailed from Baltimore, Md., but for over 26 years I have been a resident of Washington, D. C.

Criticism of First Prize Design in Bungalow Competition.

From A. S. W., Yonkers, N. Y.—I am still left in the dark as far as Mr. Fidler's explanation is concerned, as I fail to see where there is any division between the cost of labor and the cost of material.

I wish to correct Mr. Fidler's statement where he says, "'A. S. W.' evidently makes a jump at the whole and lands on two parts—'carpenter work' and 'plastering,'" as there was no rash "jumping" whatever. But after careful consideration of the three prize designs and after reading the requirements given in the December issue of 1908, stated as follows: "The cost of labor in connection with the various parts of the work must be given separately from the cost of materials," I came to the conclusion that Mr. Fidler had either failed to comply with the requirements or he intended the 5 per cent. to cover the cost of all labor necessary to construct the building.

I agree with Mr. Fidler that it would be exceedingly ridiculous to think that the bungalow could be built for 5 per cent. of the cost of materials. And I hope Mr. Fidler doesn't think I am dense enough to presume anything of the kind.

Thinking Mr. Fidler best authority, next to the judges, I was presumptuous enough to ask him for an explanation. But he simply stated that 5 per cent. was not to be the cost of labor, consequently we must presume that the learned architect has not complied with the requirements but has included the cost of labor with the cost of material.

Let us hope that as Mr. Fidler gains in experience he will learn to make some allowances for the vagaries of a diseased mind.

I wish to thank Mr. Fidler for his kind compliments in regard to figuring, &c.; also the very courteous and satisfactory manner in which he answers my questions.

The question is evidently a painful one before the eyes of Mr. Fidler, therefore, we must excuse him from further explanation and let the matter rest in the unsettled manner in which it now appears.

Note.—In connection with this discussion we would state for the sake of general information that the intent of the conditions governing the contest as regards the estimate of cost was, among other things, to bring out the cost of labor as expressed by the rate of wages per day or hour current in each locality, separately from the cost of the materials per foot, yard, or thousand, as the case may be. In this respect it is evident the prize winners complied,—some, however, more in detail than others.

Some Questions in House Construction.

From J. C. K., Brooklyn, N. Y.—I have been a reader of *Carpentry and Building* since 1891 and have derived from its columns much of benefit and pleasure. I now come to the readers of the Correspondence Department for a little information on the following subjects:

I intend to build a frame house 20 x 28 ft. in plan, containing six rooms and cellar, the building to be located on a plot, with sandy soil, 100 x 125 ft. in area. What I want to know is this:

Will a foundation wall 8 in. thick and 7 ft. high, built of concrete, be strong enough to resist the pressure of the outside earth, the wall to extend 4 ft. below grade?

Will the liquid from a septic tank contaminate the water supply drawn from the ground? It is intended to place the septic tank some little distance from the house, but between it and the latter is to be located the cistern and the well.

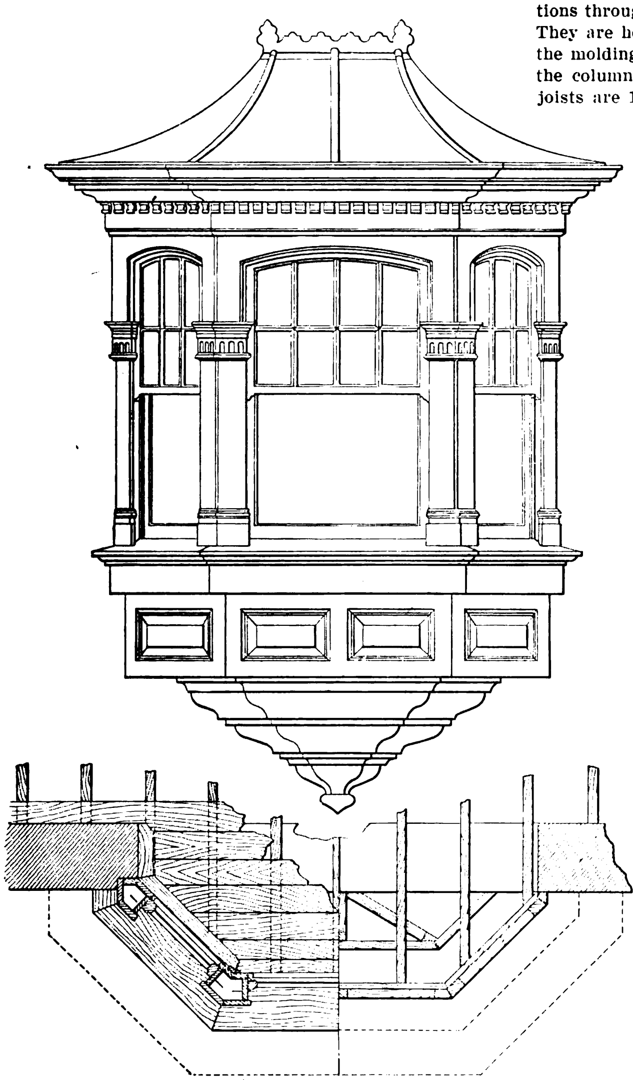
DETAILS OF AN ORIEL WINDOW.

FRAMING details are always interesting to the ambitious carpenter who is anxious to make progress in his chosen calling, and to know how certain work is done in various sections of the country, as it is possible for him through a study of such methods to gain much information that is of suggestive value. One phase of carpentry with which he will often be called upon to deal relates to the construction of oriel windows, and with a view to showing how work of this kind is done in English builders, we present herewith details of an oriel window suitable for a villa residence, taken from one of our London contemporaries. While the practice here illustrated differs in some degree from the methods of framing similar work in this country, yet there is much in connection with the matter that will prove interesting.

Referring to the illustrations, Figs. 1 and 2 represent an elevation of the finished window, together with a plan view clearly indicating the method of framing. The window has double hung sash, the frame being of the usual cased or boxed type and ornameted with a cornice molding and dentils. The base of the window is framed as shown. In describing the work our contemporary says:

The floor joists are carried over the wall to meet the window bay, where they are trimmed off, and cased round on their ends with 1-in. board, to receive the framed and paneled plinth, as shown in the right hand of the plan, Fig. 2. The scantling for the support of the sham corbelling is also indicated here. A vertical section near the center of the elevation is given in Fig. 3. The sill is attached to the frame of the plinth and also secured by the inside lining. The space between the plinth and inner lining is filled with "slag wool." An enlarged section of the sill is shown in Fig. 4. Enlarged cross sections through the boxed frames are given in Figs. 5 and 6. They are housed to the sill and secured to the head. Then the molding is attached, to form the capital and base of the column, as indicated at Figs. 7 and 8. The ceiling joists are $1\frac{1}{2}$ x 3 in. and are attached to the under side of the wood lintels and rest upon the "head."

The curved rafters are $1\frac{1}{2}$ x $2\frac{1}{2}$ in., covered with $\frac{7}{8}$ in. boards, to receive the lead roof covering. An ornamental cast iron gutter is carried around on a facia board, which



Figs. 1 and 2.—Elevation and Framing Plan.

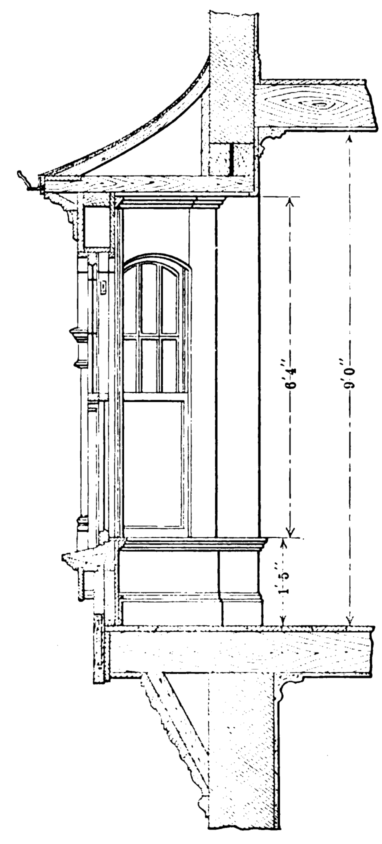


Fig. 3.—Vertical Section Through the Window.

Details of an Oriel Window.

is attached to the ends of the ceiling joists; the drain from the gutter may be carried to the nearest down pipe, or a short spout or "gargoyle" may be used instead, when the distance to down pipe is too great. A bold cornice molding is attached immediately below the cast iron gutter; also under the cornice a molded and dentiled board is mitered around the frame, which gives a pleasing finish to the design.

An enlarged front view and section of the dentiled board referred to is given in Figs. 9 and 10, the detail of meeting rails of sashes being indicated in Fig. 11. If the outer walls are finished in rough cast or in stucco, or if faced with pressed red brick with white putty joints, then the woodwork would look extremely well finished in white japan.

Millmen Taking Off Items from Architects' Drawings.

The correct reading of architects' drawings or blue prints is a difficulty which is not confined alone to the ambitious young carpenter and builder, who intends to make contracting his chosen calling in life, but the millman often experiences trouble in readily comprehending what is required by the drawings of the architect designing the work. Much has been written about the method of procedure in acquiring the ability to readily read architects' plans, and in some cities classes have been established for the special purpose of enabling the young draftsman and building mechanic to acquire this knowledge. A correspondent in a recent issue of the *Wood Worker* recently asked for information on the subject, and in a later issue a writer gave his ideas of taking off items from plans or blue prints, the matter, of course, being treated from the standpoint of the millman. He says:

The first thing to do after getting possession of a set of plans and specifications is to read over the entire specifications carefully.

Now some reader will no doubt wonder why it should be necessary to read the entire specifications when you want only the mill work items. My reason is, some architects (or, rather, would-be architects), although they may have certain pages or paragraphs of the specifications devoted exclusively to mill work, will invariably get some things mixed in with the carpenters' or plumbers' specifications that should come under mill work, such as scuttle doors, sink boards, &c., and when the job is about finished the architect generally calls on the mill to furnish them.

After becoming familiar with the specifications proceed with the outside door and window frames, commencing with the basement and finishing with gable and dormer frames, always stating kind of sash or doors, whether glazed, open or paneled, kind of glass, if glazed, and kind of finish to be used for each frame. If for brick or stone building, state if jamb linings, arch bars or sills are required.

As outside mill work comes next, take off carefully outside base, water table, corner boards, number of lineal feet of main, gable, dormer and porch cornice, giving number of members and width and thickness of each; then porch columns, newels, balusfrade, steps, &c.

Next we will take all inside frames, treating them similar to outside frames, stating which is closet frames, as it is customary to figure one set of finish to match general finish, course, and one set plain finish.

Now we are ready for other interior finish, such as base, chair rail, picture mold, &c. I have found nothing more expedient and accurate for taking off these items than a small rota-meter, which may be purchased from any reliable dealer in architects' supplies for a small amount, and will pay for itself in a very short time.

All stairs are generally figured and gotten out by a regular stair shop or factory; I will not mention them further at present, but may at some future time.

Care must be taken to get all that both plans and specifications call for, such as outside steps, lattice panels, plate rail for dining room, corner beads for exposed plaster corners, sink trim, medicine cabinets, &c. These small items are the ones mostly overlooked or forgotten, and if you happen to be making up an estimate on the work, and leave out a few small items, and finally land the job, you will find that your profit will suffer.

One of the most aggravating and trying experiences for the man that prices the items, and also for the mill superintendent, is to find that whoever took off the items failed to specify the kind of wood to be used, sometimes even omitting the thickness of doors, sash, &c., all due to carelessness.

To make a success of this work a man must needs be an architectural draftsman, or at least must be familiar with the scale rule and have some idea of what the building will look like when completed, for if you can't read plans you may get lost.

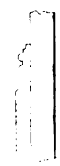
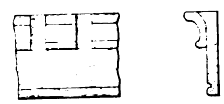


Fig. 8.—The Base.


Figs. 9 and 10.—Details of Dentil Course.

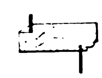


Fig. 11.—Meeting Rail of Sash.

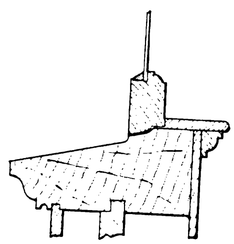
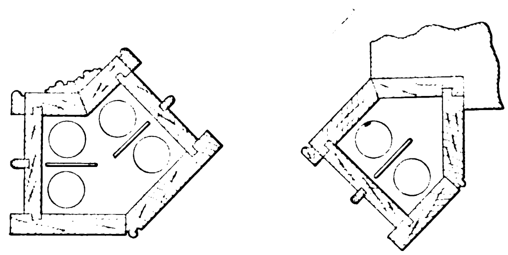


Fig. 4.—Section Through Window Sill.


Figs. 5 and 6.—Horizontal Sections Through the Window Frames.

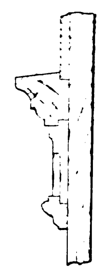


Fig. 7.—Section Through Head Casing.

Details of an Oriel Window.

New Dwelling Houses in Philadelphia.

An idea of the extent to which new homes are being built in the city of Philadelphia and its immediate suburbs may be gathered from the statement that among the operations under way is one involving over 200 dwellings recently commenced in South Philadelphia, Pa., in the neighborhood of Twenty-fourth and Tasker streets. All of the dwellings will be two stories in hight and each will contain six rooms and bath. Fifty-nine of the houses are classed as large and 149 as small, the difference being in the sizes of the lots and consequently in the sizes of the rooms. The smallest sized lots are 14 and 15 ft. front, with depths of from 46 to 50 ft.

Another operation on Arch and Filbert streets embraces 63 two-story dwellings and 18 two-story stores and dwellings, the estimated cost of all of which is $194,000.

There has also been commenced 17 two-story dwellings, each covering an area 15 x 54 ft., on Mifflin street, west of Twentieth, and 10 three-story houses on Twelfth street in the Forty-second Ward, the latter estimated to cost $36,000. Still another operation involves 46 houses at Tioga and G streets, to cost about $90,000.

It is interesting to note that during the first six months of the current year work was commenced on 5613 dwelling houses, estimated to cost $12,769,525.

WHAT BUILDERS ARE DOING.

THERE has been a marked falling off in building operations in the city of Atlanta as compared with this time last year—a condition quite the opposite of that which appears to exist in many other sections of the country. It is not, however, surprising locally when the extent to which building operations have been conducted in the recent past is considered. Last month 297 permits were issued by the Building Department for improvements to cost $346,874, while in July last year 385 permits were taken out for work estimated to cost $514,857.

The members of the Builders' Exchange held their annual outing and barbecue on the afternoon of July 31 at the grounds of the Cold Springs Barbecue Club, at East Point. After the dinner had been served the members held a quarterly business meeting, after which there was dancing, music and other amusements.

Chicago, Ill.

Though falling below the phenomenal record of the previous month, the building permits issued in Chicago for July exceeded in cost by a considerable margin those of the same period last year. The figures for July, 1909, are as follows: There were 957 permits for buildings, with a frontage of 26,978 ft., to cost $6,782,050, which compares with permits for 952 buildings, with 25,753 ft. frontage and a cost of $5,432,390, in July, 1908.

The total cost of permits for the first seven months of this year aggregates $57,242,980.

Plans for the construction of two new buildings in the loop have been announced, which are likely to go into this year's record, although the actual work of construction will probably not be begun until next spring. One of these, an office building, 55 x 163 ft., to be erected on the northwest corner of Madison street and Wabash avenue, is to be 17 stories and basement and of modern fireproof construction. The other building, 91 x 189 ft., to be erected on Monroe street, west of Clark street, will be 21 stories in hight, with basement and sub-basement, and will cost $1,000,000. Building operations in general are going along smoothly with no interruption of consequence from labor disputes, which in former years have proved a serious obstacle to progress.

Cleveland, Ohio.

Building operations continue very active in Cleveland, and all indications are that there will be no letup during the balance of the year. In July there were 618 permits issued by the Building Inspector's office for new structures and additions, estimated to cost $1,282,363, as compared with permits issued in June, aggregating $1,349,004. While the figures show a slight falling off this is not due to any less activity, but to the fact that no permits for very large office or mercantile buildings were issued during the month. A number of large buildings are now under construction, but permits for these were taken out earlier in the season. In July last year permits were issued calling for an oulay of $859,524.

A large amount of new work in the line of store and office buildings from two to five stories is being projected, and a fair volume of work in the erection of apartments, terraces and dwelling houses is coming out.

Denver, Colo.

The adjustment of the labor differences has resulted in a resumption of building operations upon a scale more nearly in keeping with that current before the friction arose. This is apparent from the fact that in July 280 permits were issued from the office of Inspector R. Willison of the Building Department for improvements, involving an estimated outlay of $2,240,670, while in June the value of the improvements for which permits were issued was only $853,385. In July last year 276 permits were taken out for building improvements, involving an outlay of $698,025.

Of the work projected last month the bulk of the capital involved was for 24 business buildings to cost $1,630,600. There was, however, no let up in the permits for residences which covered 116 brick dwellings to cost $305,350, and 24 frame residences to cost $23,800. Permits were also issued for seven apartment houses, involving an estimated outlay of $136,000.

Since January 1 the Building Department issued 2091 permits, calling for an estimated outlay of $7,630,478, whereas in the corresponding period of last year 1857 permits were issued, involving an estimated outlay of $5,892,385.

Detroit, Mich.

The volume of new work in the building line projected in July was larger than for any corresponding month in the history of the city. Permits were issued for 371 new structures and 58 additions and alterations, calling for an estimated outlay of $1,601,850, as against $849,950 in July last year. The previous largest July record was that of 1907, when the permits issued called for an expenditure of $1,576,700.

The last week in the month was especially notable in that the permits issued covered improvements estimated to cost over $600,000, these including business structures and high-class dwellings. The largest permit was that for a six-story building for business purposes, to cost $170,000, while that for the addition to the plant of the Packard Motor Car Company, a four-story reinforced concrete structure, called for an expenditure of $60,000.

The total value of the improvements for which permits were issued during the first seven months of the current year was $7,520,080, while in the corresponding period of last year the total was $5,417,350.

Kansas City, Mo.

That the city is making rapid advancement is strikingly manifested by the number of permits being issued from month to month by the Superintendent of Buildings. The estimated cost of the new work for which the 342 permits were issued in July was $1,334,715, which is an increase over the same month of last year of $560,482. Of this total 51 were for brick structures, having a frontage of 2310 ft., and costing $713,400, while 149 were for frame buildings, with a frontage of 4775 ft., and costing $519,350. The increase is looked upon as somewhat remarkable, in view of the fact that the permits issued were for ordinary buildings, there being but very few costly ones among them.

Minneapolis, Minn.

There was a slight increase last month in building activity as compared with this season a year ago, the gains showing both in the number of operations for which permits were issued and in the estimated cost. According to the figures compiled in the office of Building Inspector James G. Houghton, there were permits issued for 610 buildings to cost $1,001,180, while in July last year 524 permits were issued for building improvements to cost $945,485.

The Minneapolis Builders' Exchange held their annual summer outing at Lake Minnetonka, July 31, 300 members and their families participating. Six electric cars were chartered to take the members and their families to the lake. A series of athletic contests and games were pulled off during the day and prizes awarded to the winners, the most exciting and interesting of which were those participated in by the ladies. Dinner was served at Tonka Bay Hotel, a famous summer resort. In the evening the party boarded a steamboat for a moonlight excursion on the lake. An orchestra and quartette furnished music during the ride.

Montreal, Can.

The Builders' Exchange of Montreal has just issued its year book for 1909 containing the constitution, by-laws and business classification of members of the exchange, together with legal and practical information for all engaged in the building industry. It is a work of 116 pages, bound in leather covers with side title in gilt. An interesting feature is a list of prices adopted by the Master Painters and Decorators' Association of Montreal and printed in English and French.

Norfolk, Va.

The Builders' Exchange has secured permanent quarters in the building at City Hall avenue and Granby street, where they will have the entire second floor. This will give the organization about 8000 sq. ft. of floor space, which will be divided into various rooms required for the convenience of the exchange. There will also be a space for the exhibition of building materials and appliances.

At the first meeting of the Board of Directors of the exchange held on Monday, August 2, A. Christe was appointed permanent secretary of the organization. Mr. Christe is exceptionally well and favorably known in the building trades of the city, and he was selected, we understand, because of his experience and progressive ideas.

Newark, N. J.

Building is seasonably active, and the report of W. P. O'Rourke, Superintendent of Building, for July shows an increased volume of operations as compared with the corresponding month last year. According to his figures, 225 permits were issued in July for building improvements to cost $990,990, while in July a year ago 194 permits were issued for new work to cost $747,271. Much building is going on in the tenth and eleventh wards, and in connection with the new work there are also many applications for alterations. Considerable work is also developing in the suburban sections, influenced in large measure by the opening of the new McAdoo tunnels under the Hudson River.

New York City.

The proposed building code over which experts had been struggling for more than two years and which was passed by the Board of Aldermen since our last issue went to press, was vetoed on July 23 by Mayor McClellan, who objected in a general way to the entire document and specifically to seven provisions, which he enumerated in a letter to the board suggesting that the whole code be reconsidered. The rush, however, of investors and builders to file plans for proposed operations before final action on the code was reflected in the figures of the Building Department for July, and had the effect of making the month's record so far as proposed tenement house construction was concerned the highest in total capital investment for any July in the history of the Department.

In other words, out of a total of permits filed in the Borough of Manhattan for 113 new buildings, to cost $17,778,390, there were 56 for tenement houses, estimated to cost $13,042,000. In July last year out of a total of permits for 52 buildings, to cost $12,281,750, there were only 16 tenement houses projected, estimated to cost $2,233,000. Another item of interest in last month's report covering the Borough of Manhattan was the number of buildings intended to be used as stores. Of this class permits were issued for 24, to cost $3,530,000. These two classes of buildings it will be seen constitute the bulk of the new work projected last month.

For the seven months of the current year 2790 permits were issued for building improvements, to cost $106,446,415, as against 2212 permits for improvements, involving an estimated outlay of $57,952,717 in the corresponding period last year.

In the Borough of the Bronx 229 permits were issued for new work, involving an estimated outlay of $3,664,400, which figures compare with 181 permits for building improvements, to cost $1,882,000, in July last year.

In Brooklyn there were 758 new buildings projected, to cost $4,483,865, while in July last year permits were taken out for 506 buildings improvements, to cost $3,306,425. Since the first of the year permits were issued for 5900 buildings, involving an estimated outlay of $32,722,000, while in the corresponding months a year ago 2891 permits were issued for building improvements, to cost $16,272,600.

In the Borough of Queens the total value of the building improvements for which permits were issued in July was $2,509,000, as contrasted with $916,250 in July a year ago.

An interesting feature of the building material market has been the steady decline in the price of brick, while practically everything else in the way of materials entering into the construction of buildings has been showing an advancing tendency.

Oakland, Cal.

The records of the Building Inspector for the month just closed show a considerable drop as compared with the same time last year, as well as a falling off from the records of recent months of this year. The total valuation of the permits issued in this city during July was $406,326.50, as compared with $563,811.25 for the same month last year, and an average of about $500,000 for the earlier months of this year. Nevertheless builders claim that there is considerable activity in construction matters, and that there is certainly no actual falling off in the work under way. The explanation offered for the poor showing in permits is that there has been an accidental absence of the larger sort of permits.

Omaha, Neb.

During the month of July permits were issued for some rather large work, which brings the total close to the $1,000,000 mark, and therefore shows a large increase as compared with the corresponding month a year ago. Permits were taken out last month for the Brandeis' Theater and Office Building to cost $400,000; the Creighton University Laboratory Building to cost $43,000, while numerous additions to existing buildings range all the way from $5000 to $10,000 each. The total for July was 162 permits for building improvements to cost $815,230, while in July last year 143 permits were issued for structures to cost $576,040.

Thus far the current year permits have been issued for building improvements, involving an estimated outlay of $4,358,590, which is only $242,260 short of the record for the entire 12 months of last year. The largest single permit this year was for the new Douglas County Court House to cost $1,000,000.

Philadelphia, Pa.

Building operations in this city continue to move forward at such a rate that should the present steady gain be maintained the year's business will probably exceed any heretofore recorded. The total expenditure authorized so far this year, aggregating $25,792,340, falls but $650,000 below the total for the same period during the banner year of 1906, and it is confidently believed that the aggregate of a little over $40,000,000 for that year will not only be reached, but exceeded, when the total volume of the work for this year is known. Compared with building operations during the first seven months of 1908, those during the same period this year show an increase of about 55 per cent. Expenditures authorized during the current year total $25,792,340 for 10,956 operations, as compared with 7908 operations, estimated to cost $16,679,990, for the same period last year.

Statistics compiled by the Bureau of Building Inspection show that during the month of July 826 permits for 1541 operations were issued, the estimated cost of the work being $3,897,590. Only twice during the past 10 years has this total for the month of July been exceeded, in 1902 and 1906, and in those years the amount was only exceeded by $125,000 and $168,000, respectively. Dwelling houses continue to lead the classified list of operations. During July the estimated cost of two-story houses was $1,489,990, while that for three-story dwellings was $337,400, which, although slightly less than the total for June, exceeds those for the month of July last year materially and compares very favorably with the same class of work during the month of August in 1906 and 1907. Expenditures for manufactories, workshops, engine and boiler houses show a material increase, while an improvement in tenement house building is also to be noted.

Pittsburgh, Pa.

The present building situation affords a decidedly gratifying contrast with the condition which prevailed a year ago at this time in this important industry. A portion of this increased activity may be due to the fact that building can be done just now considerably less than for some years past, but the bulk of the business is generally put down to the steady growth of the city. Architects report a rather wide range of prices quoted on practically every line of building material, whether for structures intended for business or for dwelling purposes, this indicating that there is rather keen competition for the orders offering. It is felt, however, that prices probably will never be very much lower than they are at present, but on the contrary building is likely to be more costly before the close of next year. The activity of the professional builder this summer goes to show that he is anticipating higher cost for building material a year hence.

The figures compiled in the office of the Superintendent of Building Construction show permits to have been issued in July for 337 buildings estimated to cost $1,506,923, while in July last year permits were issued for 444 buildings estimated to cost $782,127, thus showing that the work now being undertaken is of a much more pretentious nature than was the case a year ago.

Portland, Ore.

Notwithstanding the fact that the building permits of Portland dropped off considerably during July, the total for the year to date is still nearly 22 per cent. ahead of last year and ahead of the best previous year to the same date. The aggregate figures for the seven months ending July 31 show 2643 permits, with a total valuation of $7,216,805, as compared with 3049 permits, with a total valuation of $5,925,970.

The record for July shows 406 permits, with an aggregate valuation of $911,570, as compared with 400 permits, with an aggregate valuation of $865,300 for the month preceding and 459 permits, with a total valuation of $1,038,366 for the month of July last year.

There is little change in the situation as far as materials is concerned. Lumber is quoted as before, and there is an abundant supply of brick at the old prices. Heavy receipts of Portland cement have reached this port recently and the consumption is large.

Rochester, N. Y.

The regular monthly report of permits issued by the Building Bureau for July shows permits to have been issued for building improvements calling for an estimated outlay of $1,030,815, while in the same month last year the value of the projected improvements in the building line was only $363,845. Very often in July there is less doing in the building line than in June, but this year the let-up was hardly appreciable, as the total value of the improvements for which permits were issued in June was $1,061,268.

The members of the Builders' and Traders' Exchange held their fourth annual outing at Manitou on Tuesday, July 27. The day was spent in baseball contests and sports of various kinds. A fish and chicken dinner was served, and at 8 o'clock the members and their guests left Manitou Beach for Ontario Beach Park, where they witnessed the fireworks and other features of the place.

San Francisco, Cal.

In the face of a general improvement in almost all lines and increased ease in money there has been a drop in the launching of new building projects in all the important cities of the Pacific Coast. From Los Angeles north the showing made for July compares unfavorably with that for the previous months of the present year, and, in most cases, the same may be said of a comparison with the same month of last year. The more optimistic builders ascribe this to the vacation season, but the fact remains that July is usually a good building month in most of the Coast cities. Investors admit that the renting of new buildings is not as profitable as it was, and that while interest is low and materials and labor at least no higher than they have been, there is not the same inducement to erect new buildings as existed earlier.

In San Francisco there is a great deal of work under way, but apparently the new work that was promised for the summer months is still being held up. The total of the building permits for the month of July was only $2,154,999, as compared with $2,853,173 for June and $3,139,027 for July, 1908.

The Superior Court of this city has declared unconstitutional the law recently passed by the State Legislature forbidding the construction of tenement and apartment houses on lots more than 100 ft. long in cases where there were frontages at each end, except where there was an open space at least 12 ft. wide dividing the building above the first story into two parts.

The construction of new apartment houses, club houses and private hotels is on the increase in this city. Among the buildings of this sort now in plan or already contracted for are: The Leszinsky Apartments, on Sutter street, to cost $75,000; the Avenue Hotel, at Van Ness avenue and Sacramento street, to cost $755,000; the Hancock Apartment House, on Ellis Street, to cost $60,000; the six-story Charles Wayland Hotel Building, on Bush street, near Grant avenue; the Elks' Clubhouse, on Powell street, to cost $200,000, and the nine-story Y. M. C. A. Building, at Golden Gate avenue and Leavenworth street, to cost $500,000.

Seattle, Wash.

Fully one-third of the new work projected last month in this city was in the nature of frame dwellings, permits having been issued for 217, involving an estimated outlay of $413,515. The monthly report of Francis W. Grent, Superintendent of the Department of Buildings, shows 1078 permits to have been taken out for work estimated to cost $1,275,410, these figures comparing with 1044 permits for improvements estimated to cost $943,190 in July a year ago.

From January 1 to July 31, inclusive, the Department issued 8977 permits for building improvements, estimated to cost $12,380,065. In the same period last year 7140 permits were issued for improvements to cost $605,750, thus showing that the present year thus far has witnessed a degree of activity in the building line just about double that of the corresponding period of a year ago.

LAW IN THE BUILDING TRADES.

By A. L. H. Street.

DELAYED COMPLETION OF WORK—EFFECT OF ACCEPTANCE.

Where work is not completed within the time specified in the contract, it is proper for the contractor to show that when completed the owner accepted it and enjoyed its benefits. When a contractor is permitted to finish work after the time fixed for completion, all right to object on account of the delay is waived and the law implies a promise to pay what the work is reasonably worth. (Maryland Court of Appeals.) Kendrick & Roberts *vs.* Warren Bros. Company, 72 Atl. Rep. 461.

RIGHTS OF SURVIVING PARTNERS.

The surviving partner of a firm of contractors and builders, with the acquiescence of the executrix of the deceased partner's will, continued after such dissolution of the partnership to use the plant, materials and capital of the firm to prosecute and complete the work of reconstructing a cottage commenced before the death of his partner, and also to make repairs upon another building, pursuant to an engagement made before the dissolution. By a decree of the probate court the surviving partner was ordered to account for the entire net profits of the two contracts without any deduction for the services and money which he contributed to the earning of such profits. It also appeared that the surviving partner, who gave bond to settle the partnership affairs, omitted to charge himself with the gain represented by the difference between the appraised value and the actual value of the personal property. Held, that inasmuch as the good faith of the surviving partner was not impeached, the most that the representatives of the deceased partner can justly demand is that the profits be divided according to the capital after deducting such share of them as is attributable to the skill and services of the surviving partner; but that in the absence of any agreement that the surviving partner should take over the personal property at the appraisal, he was not entitled to the benefit of any difference there might be between the appraised value and the actual value of the property, but should charge himself in his account with such increase in value. (Maine Supreme Judicial Court) Whittaker *vs.* Jordan, 72 Atl. Rep. 682.

ARCHITECT'S CERTIFICATE EVIDENCE OF PERFORMANCE OF CONTRACT.

Where a building contract constituted the architects the owner's supervising agents, but did not in terms authorize the architects to issue a conclusive final certificate, an architect's final certificate was only prima facie evidence that the work had been performed according to the contract, and placed the burden of proof on the owner to impeach the same for error, mistake, omission or concealment. On the completion of a contract for the construction of a building the architect's certificate recited that there was due the contractor $17,841, from which the owner was entitled to deduct $3,631.63, of which $956.71 was for bills assumed by the owner for the contractor and $200 was for defective plastering, leaving $2274.92 or less than five per cent. of the contract price, representing the value of the uncompleted work. Held that, though the owner was entitled to credit for such sum, it was not sufficient to show that the contract had not been substantially complied with so as to justify the owner in refusing to pay the contractor the balance. Where the owner of a building in process of erection let a large amount of the work and the furnishing of materials to independent contractors, and their delay caused part of the general contractor's delay, the owner was chargeable with the independent contractor's delay, and the general contractor was relieved from liability for a contract penalty for delay, as the court would not attempt to apportion the same. Where the owners of a building in process of erection permitted the architects, who were the owners' supervising agents, to contract for extras without protest, and after the extras had been inserted, continued in possession and enjoyment thereof, the owners could not thereafter deny the general authority of the superintendents to order them. (United States Circuit Court of Appeals, Fourth Circuit.) Jefferson Hotel Company *vs.* Brumbaugh, 168 Fed. 867.

MEASURE OF DAMAGE FOR BREACH OF BUILDING CONTRACT.

On a breach by the owner of a contract for furnishing materials and constructing a building, the contractor is entitled to recover the reasonable value of the materials furnished and work performed, together with such reasonable profits as he might have earned had he been permitted to complete the contract. (New York Supreme Court, Appellate Division, Second Department.) Carlin *vs.* City of New York, 116 N. Y. Supp. 346.

VALIDATION OF MECHANICS' LIENS.

Where, at the time of filing notice of mechanic's lien, the owner had paid the entire contract price to the contractor, a delivery, within 90 days prior to the filing of the lien, of materials worth 10 to 12 cents, alleged to have been ordered to replace defective materials previously delivered, did not constitute a delivery of materials which would validate the lien. Under New York Code, Civ. Proc. section 3412, if a mechanic's lienor fails to establish a valid lien, he may recover judgment in the action on a contract against any party to the action. (New York Supreme Court, Appellate Term.) Van Nest Woodworking Co. *vs.* Minka et al, 116 N. Y. Supp. 619.

RIGHT OF MATERIALMAN ACTING IN GOOD FAITH.

A materialman who, in good faith, furnishes material to a contractor, which is delivered to one of the owners on the premises where the building is in course of construction and upon representations by the contractor that the material so furnished is to be used in construction of such building, is protected in the filing of his itemized and verified account of material so furnished for sixty days from the date of the delivery of the last item furnished, and the filing and recording thereof in the proper office establishes his lien. (Nebraska Supreme Court.) J. B. Watkins & Co., 121 N. W. Rep. 448.

SUBCONTRACTOR'S RIGHT TO MECHANICS' LIEN.

A Washington statute provides that every person performing labor on a building has a lien thereon for such labor. Another provision declares that the contractor shall be entitled to recover only such amount as may be due according to his contract after deducting all claims of other parties for labor performed, and another statute provides for a liberal construction of the law relating to liens and proceedings thereunder. Held, that one who did plastering for a contractor under an agreement that he was to furnish the men to do the work, for which he was to be paid the amount paid the men plus $7 per day for himself and 10 per cent. of the amount paid the men, was entitled to a lien for the work performed by himself and men employed and paid by him, and was not precluded from a recovery on the ground that he acted merely as a superintendent. (Washington Supreme Court.) Smyth *vs.* Lance & Peters, 100 Pacific Reporter 995.

Roofing Slate Statistics.

A monograph on the production of slate in 1908 has been issued by the United States Geological Survey, under the authorship of A. T. Coons, with notes by T. Nelson Dale, and the following has been taken from it:

Notwithstanding the unsettled conditions of trade, labor and finance in the United States in 1908, the output of slate as reported to the United States Geological Survey increased in value $297,597—from $6,019,220 in 1907 to $6,316,817 in 1908. This value for 1908 is the largest reported for any year since the beginning of the compilation of slate statistics in 1879, when the output was valued at $1,231,221 and was composed entirely of roofing slate.

Of the total value of the slate production in the United States over 80 per cent. represents roofing slate. In 1908 the production of roofing slate was reported as 1,333,171 squares, valued at $5,186,167; in 1907 the figures reported were 1,277,554 squares, valued at $4,817,769, an increase for 1908 of 55,617 squares in quantity and of $368,398 in value. The increase in average value per square from $3.77 in 1907 to $3.89 in 1908 was 12 cents. The ordinary price per square of No. 1 slate varies from about $3.50 to $10 per square f.o.b. at quarries, and depends on the quality, the color, size, thickness, smoothness, straightness and uniformity of the pieces. Some of the inferior slate, which is mottled or ribboned, sells as low as $2.50 per square, but specially prepared slate, with pieces carefully selected with regard to color, extra thickness and size, and extra cutting, sells as high as $30 per square. The red slate of New York commands the highest value per square for ordinary slate.

The following table shows the value of slate for roofing purposes and for mill stock from 1904 to 1908, inclusive:

VALUE OF ROOFING SLATE, 1904-1908.

	Roofing slate.—	
	Number of squares.	Value.
1904	1,233,757	$4,669,289
1905	1,241,227	4,574,550
1906	1,214,742	4,448,786
1907	1,277,554	4,817,769
1908	1,333,171	5,186,167

The following table shows the average price of roofing slate per square since 1902:

1902	$3.45	1906	$3.66
1903	3.88	1907	3.77
1904	3.78	1908	3.89
1905	3.69		

Imports and Exports.

Practically no slate is imported into the United States. In 1907 slate valued at $5404 was imported in the form of mantels, chimney pieces, &c., including $208 for roofing slate; in 1908 the importations were valued at $7227 for chimney pieces, slates, slabs, mantels, &c. In comparison with the total output, the value of roofing slate exported from this country in 1908 was very small, being only $197,216, compared with a value of $220,995 in 1907.

Characteristics of Different Slates.

The slates in the United States include a very wide range of varieties dependent upon color, texture, fissility, composition, &c. While nearly all of them possess one or two excellent features, few possess many such features and none possess them all. Several are so conspicuous for their well nigh perfect adaptation to certain uses that the demand for these slates is likely to increase with the growth of the country. Such are: The blackboard slates of the "soft vein" region in Pennsylvania, which owe their fitness not only to their dark shade, but also to their fine cleavage and the thickness of the beds, which makes it possible to split off large slabs of half inch thickness; the red roofing slates of New York and Arkansas, which owe their bright, durable color to hematite; the "unfading green" slate of Vermont, which owes the durability of its color to its very small content of the triple carbonate of lime, iron and magnesia; the very dark gray unfading roofing slates of the Peach Bottom district in Maryland and Pennsylvania, of Arvonia in Virginia and of Brownville and Monson in Maine, which owe the durability of their shade to sparseness of carbonate and in cases to the presence of graphite, and their general qualities to a very high degree of metamorphism; the very dark gray mill-stock slates of Northfield in Vermont and of Monson in Maine, and the greenish and purplish mill-stock slates of Vermont; and lastly the "sea green" roofing slates of Vermont and the very dark gray roofing slates of Northampton and Lehigh counties in Pennsylvania, which, owing to their abundant carbonate, fade more or less, sooner or later, but are less expensive. These Pennsylvania and Vermont slates will always be in demand on account of their cheapness, which is largely due to their great fissility.

Commercially Black Roofing Slate from Nevada.

A dark blue gray, commercially "black" roofing slate has been recently reported to the United States Geological Survey from the Blue Mountains in Humboldt County, Nev., about 21 miles northwest from Winnemucca, and specimens of it said to have been collected from more or less weathered outcrops have been examined by T. Nelson Dale, with the following results:

The slate is of dark bluish-gray color. To the unaided eye it has an extremely fine texture and very smooth, slightly lustrous cleavage surface. It contains some carbonaceous or graphitic matter and, as shown by magnet, a little magnetite. The sawn edges show neither pyrite nor magnetite. It does not effervesce with cold, dilute hydrochloric acid. It is sonorous and has a very high grade of fissility. The cleavage face shows traces of "grain," but the slate breaks usually at angles of 50 to 70 degrees and 30 degrees to the apparent grain.

Under the microscope this slate shows a matrix of muscovite (sericite), with well defined aggregate polarization, and is thus a mica slate. The cleavage is fine, although showing some minor irregularities in the size of particles. The fissility of this slate is as great as that of the Northampton and Lehigh, Pa., slates, but its freedom from carbonate indicates that its color is more durable. This Nevada slate is of aqueous sedimentary origin, but has undergone metamorphism. A large block should be tested by an experienced slate workman for grain and false cleavage.

Noiseless Plumbing in Residences.

A very disagreeable feature of plumbing work in the home is the noise due to the operation of plumbing fixtures. In many residences the operation of the water closet in the bathroom can be heard all over the building. Such noise, however, is unnecessary and can be avoided by intelligent design of the system and judicious selection of fixtures, says a writer in a recent issue of Shoppell's. It is well to be acquainted with the various closets that are on the market, so that when a noiseless one is wanted it can be specified by catalogue plate and number. But even when the closet is noiseless in operation, noiseless plumbing is not assured unless the supply and waste pipes are likewise proportioned to their several uses. If the supply pipes are too small there will be a disagreeable hissing sound when water is being drawn, not only at closet fixtures but at the other points in the building. Further, if the pressure is high and properly designed faucets or suitable air chambers are not provided there will be a pounding noise when a faucet is closed, due to water hammer. These sources of trouble can be eliminated by using slow closing faucets and large size supply pipes to the various fixtures.

The noise of water from closet fixtures flowing through the soil pipe can be decreased in volume by using 3-in. soil pipes in the partitions, and the remaining noise can be almost entirely done away with by filling the space around the pipe and between the laths and plaster of the partition with some nonsound conducting substance.

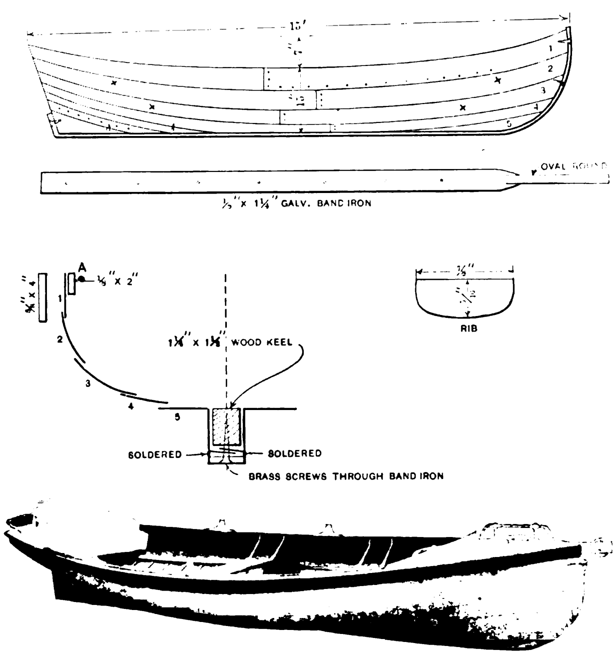
Finally, the partitions around a bathroom should be sound proofed, and, so far as possible, doors for bathrooms should be used through which but little sound will pass.

BUILDING SHEET METAL BOATS.

WITH the constantly increasing scarcity of wood and the consequent advance in the price of lumber, there has been a growing tendency for a number of years to substitute other materials where formerly no one ever considered the use of anything but wood. The principal of these displacing materials are the iron and steel products, and accordingly sheet metal is used at the present time for a greater variety of purposes than ever before. One line in which its economy and practicability has been demonstrated for a number of years, and one in which it might be used to a greater extent, is in the building of small boats. As far back as 1850 a sheet metal boat known as the Francis Patent Metallic Life Car was used in life saving work off Squam Beach, N. J.

The accompanying illustrations will give an idea of the plan of constructing sheet metal boats followed by John D. Distler, Mishawaka, Wis.

As soon as the patterns were completed from sketches work on the boat proper was started. It is 15 ft. long, 42 in. broad, 15 in. high in the center and 22 in. at the bow and stern. It has a sharp bow and the stern is pointed below the water line, flaring out as the top is approached until it is practically square. The keel is made of white oak 1¼ in. thick and 1½ in. deep, and dressed. A triangular piece of wood 1¼ in. thick and about 3 ft. long was nailed on top of the keel at the stern to form the skeg, and also as a support for the board which was used to form and reinforce the stern. The stem post was then fitted on to strengthen the bow. It is made of hardwood and forms an extension to the keel. Both the bow post and the stern board are covered with metal of the same weight as the shell of the boat.



Building Sheet Metal Boats.—General View of Completed Boat and Parts of Which It Is Composed.

The shell is made from five pairs of gores or strips of metal cut from 8 ft. stock, with joints broken amidships. The first two gores, marked 5 in the drawings, one on each side of the keel, were flanged, so that they formed up against the side of the keel and lapped across the lower edge as shown in the cut. At the stern these strips were drawn up from the keel, leaving it bare and forming a covering for a portion of the skeg. Two sheets were then cut to extend from these strips down and lap under the keel. These sheets were then riveted through the skeg. A band of iron ⅛ x 1¼ in. was laid on the under edge of the keel, lapping on to the rear of the skeg and fastened to it by brass screws 1¼ in. long spaced a few inches apart and countersunk. At the bow this band is rounded and curves up the bow post as a support. The seams between the metal strips and the iron band were soldered to make a water tight joint.

The keel was marked off into 5-in. spaces for the location of the ribs. The next pair of gores, 4, were cut and placed in position with practically no forming. Each strip was fastened to the lower one by tinned rivets, there being three in the space between each pair of ribs. The next two pairs of strips had to be raised on a block with a raising hammer, on the first pair the raising being commenced about 3 ft. from either end of the boat and on the next about 2 ft. from either end. The amount of the raising was determined by the eye and by trying, and did not take over two hours' labor. The fifth and last sections, No. 1, were then cut, and as in the previous cases riveted to the lower gores. As the different sections were put in place they were lapped around the bow post and riveted through and also through the stern board. Special care was taken to have the rivets neither too large nor too small for the holes, and they were staggered with the row on the gore below.

Ribs of elm ⅞ in. wide and 5-16 in. thick were placed in position on 5-in. centers and were fastened to each gore by a copper rivet and washer and nailed to the keel. These served to give ample stiffness to the boat. A strip of wood ⅝ x 4 in. was placed around the boat flush with the top on the outside, and a metal strip ⅛ x 2 in. on the inside to form the gunwale. A ½-in. bead was then placed around the upper edge, leaving spaces for the oar locks. A metal air chamber was constructed in each end, and afterward all seams soldered on the outside of the boat. A removable board was placed in the bottom to protect it and held in place by small clips on two longitudinal stays. Another longitudinal stay was next placed in position on each side to form a support for the seats, which were made from 1-in. lumber and braced by light iron strips. The ends of the boat were decked in and the stern seat put in place. By way of giving the boat a finished appearance, brass rails were put on the decks, and for convenience in hitching the boat a ring was attached to the bow. The boat, now ready to be painted, was first given two coats of red lead and then finishing coats to suit the taste of the owner.

In constructing such boats patterns may be dispensed with if the sheet metal worker can obtain some discarded wooden boat of the desired shape, or if such is not available and he does not desire to make his own patterns from scale drawings, they can be purchased from companies in that line of business.

THE work of constructing the foundations for the new Municipal Building at the Manhattan end of the original Brooklyn Bridge has recently been commenced, and it is expected that the cost of the work will be in the neighborhood of $1,000,000. The basis upon which the foundations will rest will be laid 96 ft. below the sea level, and it is claimed by experts that the work will be the largest foundation ever laid for a building of modern construction. It will be recalled that the new structure will occupy the site of the old *Staats-Zeitung*, and will be bounded by Park Row, Centre and Duane streets. The contract for the work has been awarded to the Foundation Company, 115 Broadway, Manhattan, New York.

THE NEW EDISON "POURED" CONCRETE HOUSE.

SOMETHING more than a year ago public attention was directed to a method of building concrete houses in large numbers by what was designated as the "pouring process," the idea being that of Thomas A. Edison, the well known inventor of Orange, N. J. The scheme was to make use of metal "forms" or molds by which the house intended for two families could be built in a few days, at a trifling cost. The matter provoked a great deal of discussion and experts in concrete construction who examined thoroughly the method of pouring the concrete into the iron molds pointed out several features which in their judgment seemed impracticable. Since that time the inventor has made further developments and now offers for the consideration of the building public a concrete house much more attractive, architectually, than was his first model and which it is claimed can be built in 14 days.

As of interest to many readers, we take the following particulars from a recent issue of the *Orange Advocate*, which prefaces the technical account, with the statement that "technical publications have already made allusions in an incomplete way to this subject, but it is the privilege of *The Advocate* to present the first complete, authentic description of the plans and details of what is at the moment Mr. Edison's favorite project.

"The house is for one family, with a floor plan 25 x 30 ft., intended to be built on lots 40 x 60 ft. The front porch extends 8 ft. and the back stoop 3 ft. On the first floor is a large front room 14 x 23 x 9.5 ft. high, intended as a living room, and a kitchen in the back 14 x 20 x 9.5 ft. high. In the corner of the front room is a wide staircase leading to the second floor. This contains two large bedrooms, a wide hall and a roomy bathroom (7 ft. 6 in. by 7 ft. 6 in. by 8 ft. 2 in. high). The third floor has two large rooms. Each room has large windows, so that there is an abundance of light and fresh air. The cellar, 7 ft. 6 in. high, extends under the whole house and will contain the boiler, wash tubs and coal bunker. The main room, as well as the outside of the house, will be richly decorated. The decorations will be cast with the house and will, therefore, be a part of the structure and not stuck on, as is done at the present time.

House Fireproof.

"The house will be entirely of reinforced concrete, including roof, floors, bath and laundry tubs. The doors and window frames will be the only parts of wood or metal, so it will be practically fireproof. It is, furthermore, water proof and vermin proof. The inside walls will be concrete also (no plaster finish). The surface, obtained by the special mixture used for the process, is perfectly smooth and can be tinted or painted if desired.

"Mr. Edison thinks that the cost of this house will be about $1200, ready for occupancy, including heating and plumbing. He has emphasized more than once that this price is not for isolated houses, but for houses built in large quantities, as in whole blocks.

"Cast iron molds will be used, which will be set up on a concrete foundation. This foundation (footing) and the cellar floor (of concrete also) will be built some time before actual building commences, to allow it to harden thoroughly. It should be understood that with foundation is not meant the cellar walls, as in an ordinary frame house, but merely a base or footing, upon which the molds are to be erected. A complete set of molds will cost approximately $25,000, while the necessary plant will cost approximately $15,000 more. It will be necessary, for successful operation, to work with at least six sets of molds, to keep the men and the machinery going.

"Mr. Edison thinks it will be possible to erect the molds for a house in four days, fill the molds with the liquid concrete in six hours, and dismantle in about four days more. Allowing six days between for hardening of the concrete will give fourteen days for a house, and in this way he figures that 144 houses can be built in one year with the six sets of molds.

"Experiments have proven so far that it is possible to make a mixture which behaves like a liquid, flows easily and fills all openings, and, further, that it is possible to keep the heavier aggregates, stone and gravel, in suspension so that they are distributed evenly throughout the mass.

"After the molds have been erected, the pouring or construction of the concrete house begins. Extra large size mixers will be used, dumping the concrete in tanks, from which it will be conveyed to a distributing tank on top of the house. A large number of pipes or open troughs lead the emulsion to various openings in the roof, from whence it flows down and fills the forms until it overflows at the top. The actual pouring will take about six hours, and while being poured the mass will be agitated to help the flow and prevent the segregation of materials. This is further accomplished by adding a certain colloid to the mixture.

"The purpose of the inventor is to furnish a sanitary home to families at present living in congested tenement districts, at such a price that rent, plus carfare, does not exceed, say, $9 per month."

Wages of Builders in Toronto, Canada.

Some interesting statistics touching the building situation in the city of Toronto have recently been contributed to the *Contract Record* by P. L. Fraser, secretary of the Builders' Exchange, and among them are figures showing the current scale of wages in the city named. These may be of interest for purposes of comparison to builders on this side of the border and we present them herewith:

	Cents per hour.		Cents per hour.
Bricklayers	.50	Gas fitters	.40
Masons	.50	Carpenters	.33
Structural ironworkers,	25 to 30	Stone cutters	.50
Ornamental ironworkers,	30 to 35	Marble cutters	30 to 35
Plasterers	.50	Marble setters	35 to 40
Lathers	.42	Painters	.35
Hoisting engineers	.35	Sheet metal workers	32½ to 35
Tile setters	.50	Electricians	.30
Plumbers	.42½	Roofers	.30
Steam fitters	.42½	Cement finishers	.40
Steam helpers	.15	Laborers	.25
		Hod carriers	.30

An examination of the table shows many striking differences in the rates when contrasted with those current in Greater New York.

Preventing Discoloration of Interior White Finish.

A Southern correspondent of that journal who has had trouble with interior white finish turning yellow and has used white lead and oil thinned with turpentine for the ground coats and French zinc ground in bleached linseed oil, thinned in turpentine for the finish, which was to be eggshell gloss, writes to the *Painters' Magazine* for information as to the remedy for the yellow appearance of the finish after the work has been done for about a month. The authority in question makes reply as follows:

The best thing to do is to purchase from a reputable paint manufacturer pure French zinc, ground in paste form in the best white damar varnish, thin it with pure spirits of turpentine to the right flowing consistency and apply it over the finish that has yellowed off. As an act of extra precaution we suggest a mossing down of the surface with No. 0 steel wool or sandpaper before applying the new finish, also the addition of a small portion of ultramarine blue to throw the white off the creamy tinge. Before applying the new coating test it out on a similar ground, and should it be too flat for eggshell finish add a trifle of white damar varnish or enough to give you the luster desired.

New Publications.

Craftsman Homes.—By Gustav Stickley. 206 pages. Size 8½ x 11 in. More than 200 illustrations. Bound in heavy board covers. Issued by the Craftsman Publishing Company. Price, $2.00, postpaid.

Every one who is at all interested in the construction and interior arrangement of a home cannot fail to find much that is of suggestive as well as practical value in the above work, the purpose of which, says the compiler, has been to make it not only a reference book on home building, but a book to which one would turn at all times with pleasure. Its more than 200 pages carry a vast fund of information on the subject indicated, while the illustrations range all the way from the cozy cottage and bungalow type of dwelling to the more pretentious residence, embracing plans, perspectives and interiors of various treatment and effect. Much of the work illustrated consists of the best of the houses designed in the Craftsman workshops and published in "The Craftsman" during the past five years and brought together in such a way as to serve to show the development of the Craftsman idea of home building, decoration and furnishing, while at the same time making plain the fundamental principles which underlie the planning of every Craftsman house.

Some of the topics treated are the Simplification of Life; The Art of Building a Home; a Craftsman City Home; a Country Clubhouse; a Craftsman Farm House; a Convenient Bungalow; Treatment of Wall Spaces; Cabinet Work for Home Workers and Students Who Wish to Learn the Fundamental Principles of Construction; a Craftsman Home for Two Families; an Open Air Dining Room; "Craftsman" Metal Work; Beautiful Garden Gates; and the Natural Garden. There are interesting chapters on the importance of halls and stairways in the general scheme of a Craftsman house; the many uses and possibilities the living room has for comfort and beauty; the dining room as a center of hospitality and good cheer, and the advantages of a convenient and well equipped kitchen. In this connection it may not be without interest to note that most of the Craftsman houses are designed for an environment which admits of plenty of ground or at least of a large garden around them, thus giving them a most picturesque setting.

In the production of this work four kinds of paper are used in order that every picture and kind of type may be reproduced to the best advantage. There are four colored inserts of Craftsman interiors which are printed on a heavy cream-coated paper and a signed portrait is on a rich Japanese vellum, in connection with which the best quality of brown duo-tone ink has been employed. The entire make-up of the work is such as to invite the serious attention not only of architects, landscape artists and home builders but of the general public as well.

Mechanics' and Material Men's Lien Laws of the Southeastern States.—By Henry A. Alexander. 776 pages. Issued by the Southeastern Publishing Company. Price, $6.00.

As its name indicates, this volume has been prepared to place conveniently before the bar and general public the mechanics' and material men's lien laws of the States of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Virginia, together with the act of Congress of 1905. The law of each of the nine States treated, embracing its statutes and the decisions construing them, is printed separately, with a separate table of contents and index relating exclusively to that State. Preceding the body of the book is a general index giving the number of the page on which the matter for each State begins and ends, the page numbers running consecutively from the beginning to the end of the book. The matter pertaining to each State is divided into seven parts. The appendix sets forth the act of Congress for 1905 for the protection of contractors and material men upon the public works of the United States, with decisions construing it. There is also a single table of federal cases relating to mechanics' liens made up of the separate tables of federal cases printed with each State.

Public Comfort Stations

Some interesting observations were made in a recent report on public comfort stations by Robert Robertson, chairman of the Sanitary Committee of the Massachusetts Plumbers' Association. In part it is as follows:

A few years ago I took a summer outing across the Atlantic and spent some time in England, Scotland and the Continent. One of the first things that interests men in our line of business and which without question draws from all Americans words of approbation and admiration is the convenient and frequent stations located in the public streets in Scotland, England and France. There is no question but what we consider ourselves far in advance of foreign countries on many matters of public utilities throughout the United States, but without question we are 20 years behind in the matter of public comfort stations. We find them across the water conveniently located in small public squares or at the intersection of two streets, and are what we might call an island of safety in the center of a large and bustling thoroughfare or square.

In England and Scotland practically all the stations are underground, but in France we find many above ground. In England, where I had the most experience, they are controlled by a "drop a penny in the slot device," which gives you a compartment containing a lavatory with towels, soap, brush, &c. When you compare the privilege that permits you in nearly every busy community of dropping into such a place as this you appreciate the utter hopelessness of finding anything of this kind in an American city, except, of course, with a very few exceptions. Ordinarily in our cities, when a man desires to brush up, he drops into a hotel or barroom. In the hotel he is looked over by a man in attendance, who waves a brush at him and if he merely does that he expects a tip, and if you don't give it you feel as though you had been pretty close. On the other hand, in the barroom you find dirty towels and sometimes filthy conditions in addition to this. Doesn't it seem strange that these conditions exist in any State that otherwise does so much for the human being?

Take, for instance, my own city of 20,000 inhabitants. We have no hotels or barrooms and no public comfort places. The consequence is that every man who does business in the center of any city or town is busy from morning to night with people who desire a drink of water or the use of your toilet room. It may seem selfish to object to this, but in my opinion it should be unnecessary, and every town or city of over 5000 inhabitants should be compelled to maintain one of these stations for every 5000 people. The installation is not expensive as compared with many other city improvements and at many busy corners where there are pay closets, &c., they would be self-supporting. We have but to look at the station at Park street, in Boston, at the corner of the Common, to see the usefulness and great benefit derived from it.

Increasing Use of Red Gum as a Cabinet Wood.

The lumber industry of the country has been provided with much valuable information by the investigations which have been made through the scientific study of many species of trees, against the use of which there has been a prejudice for one reason or other, and from an economic standpoint this is one of the most important phases of the forest work of the Government.

The latest discoveries of valuable qualities in a former neglected species resulted after an investigation of the red gum, sometimes commercially called "satin walnut," which finds its home in the hardwood bottom lands and drier swamps of the South, in mixture with ash, cottonwood and oak. Were red gum imported from a distance and obtainable only at a high price it probably would be used extensively in the manufacture of furniture, cabinet work and interior finishing, but being a native wood and low in price it has been discriminated against. Gradually this objection is being done away with, and the demand for red gum has increased very rapidly in the past few years.

The best grades of red gum, clear heart, find a market almost exclusively in the export trade, though a small amount is used in the United States for inside finishing. Practically 75 per cent. of the clear heart gum lumber cut in this country is exported for use in England, France and Germany, for the manufacture of furniture, inside trimmings, newel posts and stair railings. The commoner grades of red gum are used in the United States for cheap furniture, desks, the better grades of boxes and a number of novelties. The poorest grade goes into boxes, barrels and other articles for which short, narrow boards can be used.

The chief objection to red gum is its strong tendency to warp and twist, but this can be entirely overcome by proper handling. Were the lumber of high price this difficulty would have been considered and overcome long ago and the wood used, but on account of its abundance and cheapness very few operators have turned their attention to solving the problem.

The preparation of red gum lumber for any purpose should begin when the tree is felled. To guard against staining and warping it is handled in much the same way as other woods, but with the important difference that the piles are narrower, so that the air may circulate freely, and thus prevent fermentation of the sap, and that the cross sticks must be placed close together. It has also been found well to place heavy weights on the cars of red gum when they are sent to the kiln. Every manufacturer of high grade furniture and trim knows that to secure the best possible results the material must be redried when it reaches the factory. Some large users of red gum repile the stock after it has been carried a while, and bulk it down with cross sticks every five or six layers, so as to straighten out whatever twist there may be in the boards. This practically assures the elimination of twisting and warping. It can be handled in this way to much better advantage than where an effort is made to straighten it out by force when cutting up the stock and preparing it for use; for, when the pressure is applied gradually, there is no loss by reason of breakage or splitting. After having been dried and tempered in the air and then redried it usually loses nearly all of its warping tendency. The cost of handling lumber in this manner is not great and the good results secured thereby more than pay for whatever outlay there may be.

A plan which many furniture manufacturers have followed to good advantage and employed where red gum, oak, mahogany or other woods are used is to design the article in such a manner that the wide pieces may be reinforced, and thus prevent any warping or other defects showing up. Instances have been known where red gum boards 18 in. wide have been glued together and made into 36-in. desk tops. The tops were firmly cleated on the bottom, held to place as well as any other wood, and gave good satisfaction. This lumber had been standing on the sticks for about a year. Another manufacturer, who uses red gum for drawers and paneling, guarded against the tendency to shrink and swell by the application of a couple of coats of shellac inside and out, and found that the wood behaved as well as any that could have been used. In this instance plain sawed gum was employed, and plain sawed material ordinarily gives more trouble than quarter sawed.

SOME idea of the extent to which suburban real estate improvement operations are being conducted on the western end of Long Island may be gathered from the statement that contracts have just been awarded for the erection at Long Beach the coming fall and winter of 422 cottages, all of which it is expected will be completed by the spring of 1910. It is intimated that other houses will be put up to such an extent as to make the total more than 500. An iron pier will also be constructed extending, it is claimed, further out into the ocean than any of its kind along the Atlantic Coast.

Structural Tile of Concrete.

Concrete structural tile, made of wet mixed materials, and cast in a steam heated mold, gives the answer to most of the riddles of the past. It offers a means for building a light waterproof and fireproof wall. It has the only plastering surface suitable for exterior finish, which has long been sought by the architects to get the advantage of versatility of designing of a kind that can be made by the route of plastering alone, says a writer in a recent issue of *Rock Products*. Not only is the surface for plastering there, but the further advantage of having the outer mortar become an integral part of the wall itself, and not stuck to it, is also accomplished. It expresses a material that will make a wall as low in cost as lumber, because it gives the maximum of product with the minimum of material. It makes a complete concrete house possible from the footings to the roof.

CONTENTS.

Carpentry and Building

New York, October, 1909.

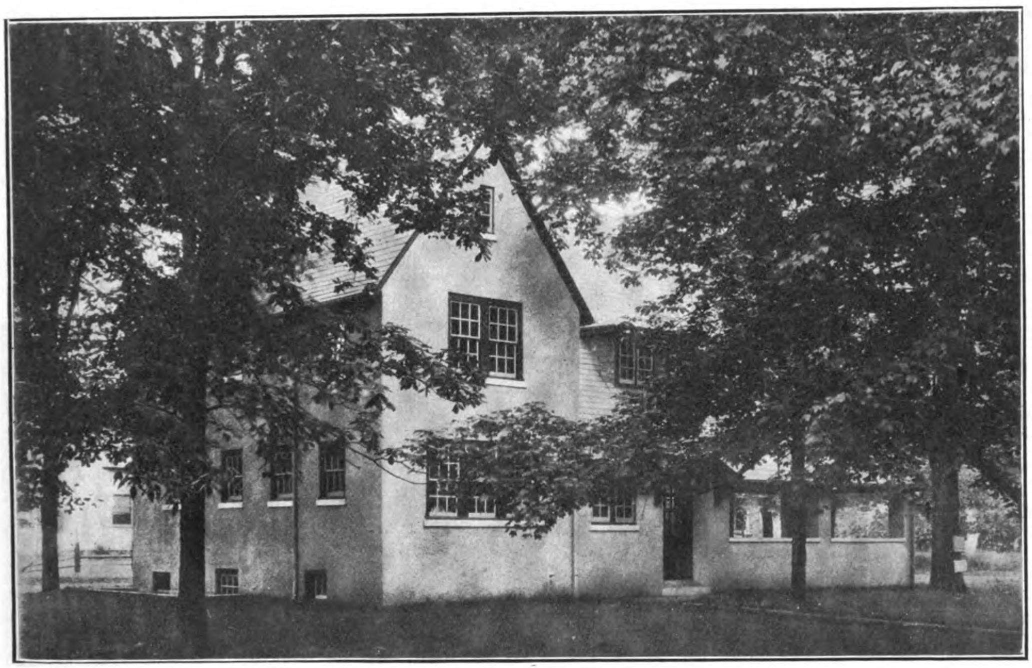
Fireproof Houses

In view of the present day agitation of fireproof construction for dwelling houses, as well as for buildings designed for business purposes of every kind, the following copyrighted article, with illustrations, from a recent issue of the *American Architect*, and contributed by Frederick Squires of the well-known architectural firm of Squires & Wynkoop, will be found to contain much that is interesting and valuable on the subject indicated.

Alexander Koch of academy architecture, in a letter on the fireproof house, said that it wouldn't be such a great loss if some of the small houses did burn down. Most of us agree with him; so, if we are to build fireproof and thereby permanent, we build better houses. Luckily the greater seriousness of designing in fireproof materials leads naturally to better and simpler buildings, and, if we do them well enough, Alexander Koch will be glad they can't burn down.

Whatever war is on between tile and concrete interests for fireproofing the skyscraper, the strictest neutrality can be said to have been maintained in the construction of these fireproof houses, because we have used both materials together. The concrete of the terra cotta construction as used in this work is the A B C of the reinforced concrete house, and nothing will familiarize the architect more quickly and easily with concrete and its broad adaptability than to build a concrete and terra cotta house.

Even before he begins to investigate it thoroughly the architect finds much to interest him in the fireproof house, because it usually has an attractive expanse of stucco and tile roof, but it is from the structural viewpoint that the building makes its more insistent appeal. Its walls and masonry floors join like the top and sides of a box and have the same stability. The owner becomes so interested in the self-evident worth of the structural process that he ordinarily pays attention to this alone and does not wish to interfere in points of design. This gives the architect a wide scope, and such liberty will not let the architect run wild, because the materials are more structural than those in which he has been most accustomed to work, and the result is a more direct and simple building than his previous efforts. The natural avoidance of wood decoration in a fireproof house has worked wonders in simplifying exterior and interior. The fact that the building is apt to stand for a long time makes for a simpler and thus for a better country house architecture.



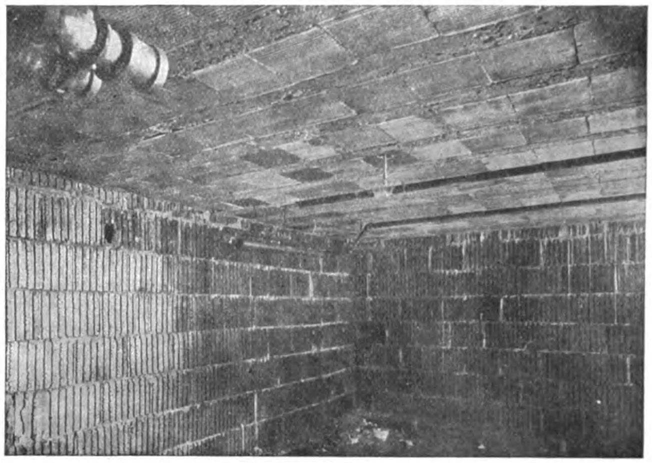
House of Mr. Edward D. Page at Mountain Station, N. J.

Fireproof Houses.—Messrs. Squires & Wynkoop, Architects, New York City.

New things go slow. The architect who has worked for years in one material is loath to begin all over again on something new. Perhaps he distrusts new methods as a consequence of some bitter experiences in connection with an attempt to serve his client, or possibly there may be other reasons for his apparent conservatism, but it sometimes happens that not until he feels that he is being left behind and that his methods are antiquated will he leave the good old ways.

Fireproof country houses are comparatively new, and there is not yet in most architects' minds the feeling that they will displace frame and near-frame buildings to any great extent. So the stimulus of apprehension for the future is not yet strong, and consequently it becomes advisable, if we would have the architect take up this new thing readily, to make it as easy as possible for him to do and assure him of pleasing results. To the man who has done most of his work in masonry the step is not difficult. The principle of bearing walls in tile is like that of brick. The floors and roofs alone are new, for the sills and lintels are only artificial reinforced stone instead of real stone. Most of our prominent architects have used enough tile in partitions to build a village of tile houses.

One look at a house in construction explains the system of forms for floor construction well enough for the architect to specify it and the local mason to build it. A warning right here: This simplicity in appearance is deceiving in cost. It has led many a contractor astray in his figures, and the architect should see that the contractor building in the metropolitan district is getting at least 25 cents a cubic foot for a fully fireproof building, or he is liable to have a building on his hands to finish by the day.



Fireproof Houses.—Fig. 1.—Interior of a House in Newark, N. J., Showing a Tile Bearing Wall with a Typical Floor Resting on It.

Tile, in common with concrete and other materials, is probably still far from its ultimate development, and many of its qualities are not yet fully understood. Dampness is, perhaps, its worst enemy, and in order to avoid it the greatest care is required in the method of constructing doors and windows in tile walls. The sill is especially vulnerable, owing to the lack of furring.

In general, a fireproof house, be its walls of brick or tile, has a concrete foundation up to the under side of the first floor beams. Spans are best kept down to about 16 ft., interior bearing walls carrying the beam ends. With a little adjustment in plan these bearing walls may be made to carry up through the building. Where openings are wanted concrete girders may take the place of the walls, and, if too much weight is thereby concentrated, their ends may be carried on concrete piers instead of tile walls, although this is seldom required. Fig. 1 shows a tile bearing wall with a typical floor resting on it. Incidentally, it shows the method of hanging heating and plumbing pipes from the ceiling and a gas outlet in the side wall. Pipe locations should be very carefully studied, as carelessness in this may result in cutting, which will seriously reduce the strength of the structure. In Fig. 2 the cutting for the electric conduits was in the worst possible place, directly under the bearing of a girder carrying a considerable floor area. It may be readily seen how little damage a ceiling outlet can do. Fig. 2 shows the best practice in forming door jambs and heads, while Figs. 3 and 4 show the Clark houses in Newark in course of construction. The contractors who are building them have done a great deal toward perfecting details of window openings—flashing, cast concrete work and waterproofing—and it is going to be by the efforts of builders with such ideals in construction that the faults of tile and other fireproof materials will be eradicated and their obvious advantages increased.

Fig. 3 shows the concrete foundations, the careful coursing of tile hights of openings, the method of casting window lintels in place and the setting of tile with openings running vertically. Fig. 5 shows the next process, exterior stucco. We recommend that this be waterproofed. The following is a part of the tile specification for this house, and is quite typical:

Concrete floor beams.—All floor beams to be 4 x 8 in., of concrete, 1, 2, 4 and reinforced with one ⅝-in. twisted ironrod secured in place 1 in. from bottom by nailing to blocks in form. These rods to be bent up at 45 degrees at a point 6 in. from their bearing, and to run to within 1 in. of the top of the beam and to continue parallel with the top of the beam to the outside of its bearing. All beams to follow framing plans provided by architects, which plans will show sizes of girders, lintels and all structural concrete members.

On top of floors lay sleepers at right angles to beams and bed in cinder concrete.

All lintels that carry ends of floor beams to be 12 in. deep by the thickness of the wall and to be 12 in. longer than the width of the opening and reinforced as specified for floor beams.

Sills.—All sills to be of concrete cast on the ground, and to have a drip and to be detailed on top to fit a rebated wooden sill.

Terra Cotta Tile.—No bearing wall, outside wall or floor to be built of tile less than 8 in. thick. Nonbearing partitions to be built of 3-in. tile. Window and outside door frames to be detailed with a strip on the outside which will bed in the lintel at the top, and will fit between 4 and 3 in. tile, which will form the jambs. Frames to be provided with a beveled strip on outside casing, which will be removed after stucco has been applied, the space caulked with oakum and the joint covered with a mold. The sills to be rebated on the bottom to cover the rebate in the cast concrete sill and for a weatherproof joint.

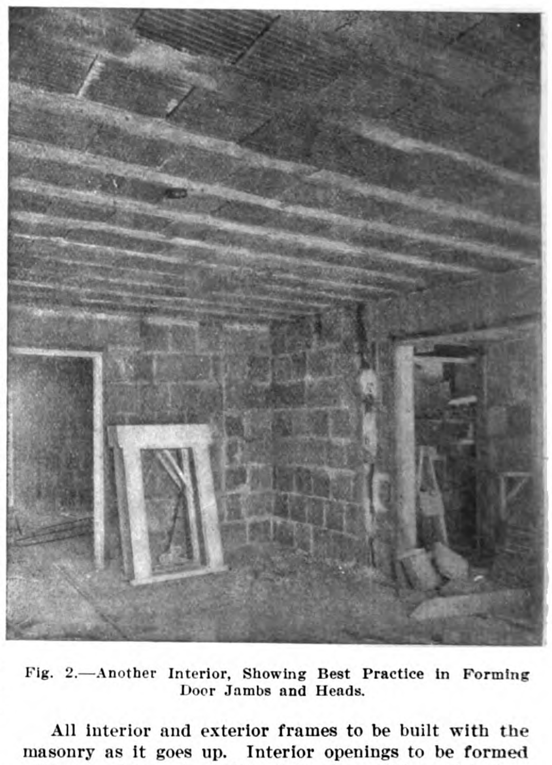
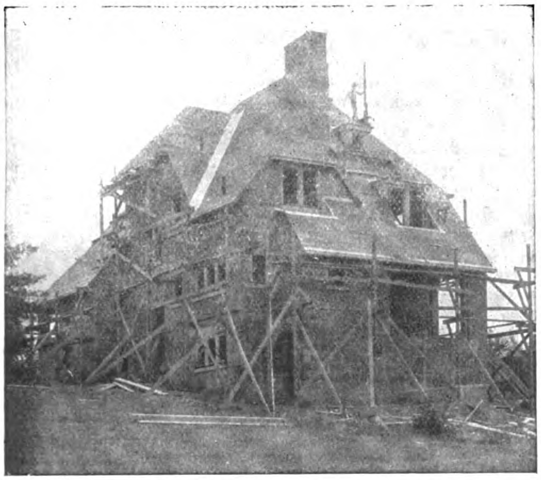


Fig. 2.—Another Interior, Showing Best Practice in Forming Door Jambs and Heads.

All interior and exterior frames to be built with the masonry as it goes up. Interior openings to be formed with wood bucks the width of the tile wall in which they occur.

Of course, there are many forms of steel reinforcement which could very well be substituted for the twisted bar specified above. The designer has a wide range from which to make his selection, and each form has its advocates.

Solid brick exterior walls may take the place of terra cotta tile, and this is still required by some departments,



Fireproof Houses.—Fig. 3.—House in Course of Construction, Showing Concrete Foundations and Method of Setting the Tile.

as Manhattan and Brooklyn. Certain houses at Sea Gate have brick walls, and their additional cost reduced the amount of fireproof work that could be used in each. The Biggs' house has a fireproof roof, but wood floor joists. The Keiser house has brick walls, furred with hollow brick, and only part of the ground floor is of reinforced concrete beams.

It was through the Church of St. Luke the Evangelist that our firm got its idea of building fireproof buildings. This building is of brick with a hollow wall and a brick interior and tile and concrete floors. This construction gave such an impression of solidity and permanence that it was shortly followed by the Interlaken house, but by that time we had learned that by using tile we could lay our hollow wall 12 in. at a time and all in one piece.

The building departments of most of the towns where we have built have accepted fireproof construction after investigation, and in many cases have welcomed it in the hope that it would displace frame. Our clients have

Fig. 4.—Another House of Same General Construction.

usually been men who could write the letters indicating an engineering degree after their names. Contractors, whenever they have been thorough workmen, have found no great difficulty in mastering the idea, and some of our best executed buildings have been the first attempt in this line of clever local masons.

If, then, good contractors will give fireproof materials earnest thought, well trained architects will give them careful study, and owners will pay a higher price for a superior article, they will produce buildings of such a character that everybody will be glad that they can't be burned down.

An Ordinance Governing the Manufacture and Use of Cement Blocks.

The Common Council of Grand Rapids, Mich., has recently adopted an ordinance governing the manufacture and use of cement blocks, from which we take the following extracts:

All blocks must be marked with maker's name for identification. The minimum weight of different sized blocks shall be as follows: 8 x 8 x 16, 53 lb.; 8 x 10 x 16, 65 lb.; 8 x 12 x 16, 78 lb.; 9 x 10 x 24, 112 lb. Transverse test: The modulus of rupture for concrete blocks at 28 days must average 150 and must not fall below 100 in any case. Compression test: The ultimate compressive strength at 28 days must average 1000 lb. per square inch. Absorption test: The percentage of absorption (being the weight of water absorbed divided by the weight of the dry sample) must not average higher than 15 per cent.

The composition of said blocks shall be: Cement, 1 part, sand and gravel, 5 parts. The sand used shall be suitable siliceous material, passing the ¼-in. mesh

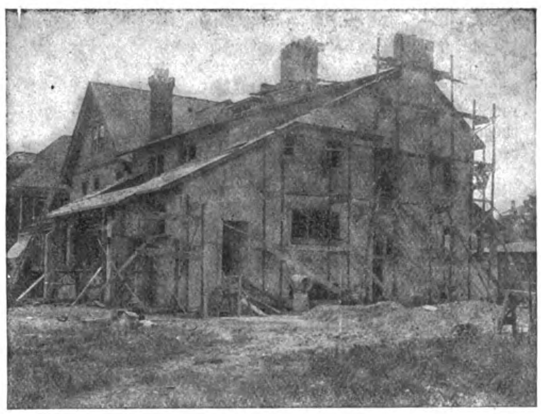


Fig. 5.—House Showing Exterior Stucco Work in Process.

sieve, clean, gritty and free from impurities. No gravel larger than will pass through a ¾-in. mesh screen shall be used in cement blocks. Each maker must use his own good judgment as to the quantity of sand and gravel in the 1 and 5 parts mixture, so that there will be no voids in the cement blocks.

Hollow cement blocks in which the ratio of cement to sand be one-third (1 part cement to 3 parts sand) shall not be used in the construction of any public building until they have attained the age of not less than three weeks. Hollow cement blocks in which the ratio of cement to sand be one-half (1 part cement to 2 parts sand) may be used in construction at the age of two weeks, with the special consent of the building inspector.

Several blocks of rich composition required for closures may be used at the age of seven days with the special consent of the same authority. Hollow cement blocks shall not be permitted in the construction of party walls, except when filled solid.

Other sections provide for thorough mixing, preferably by machine, and for inspection of blocks.

AMONG the more recent improvements projected for Riverside Drive, Borough of Manhattan, New York, is a ten story apartment house at the corner of Ninety-eighth street, to cost about $600,000. It will have five apartments on a floor, ranging from six to eight rooms each, and with two and three bathrooms. The plans have been prepared by Architects W. L. Rouse and L. A. Goldstone.

APPRENTICES IN THE BUILDING TRADES.

BY WARFIELD WEBB.

THE day of apprentices, as we once knew them, has passed away. It is in some respects regrettable, because there are so many young men who to-day prefer to get through their formative period in a rush and come out in a condition to only partially fill the positions for which they have presumably fitted themselves. This applies to structural lines in a way that should be especially considered, because there is a great demand to-day for expert mechanics, not those who so term themselves, but those who are able to make good when they undertake a line of work.

When a young man starts to learn any branch of the building industry, such as carpentering, contracting, stone masonry, brick laying, plastering, &c., he should fully understand the requirements that such work will entail and enter it with his eyes open. If he hopes to rise above his fellow men, and has ambitions in the proper direction, then he has much to learn that will come only with care, patience and conscientious work. He cannot hope to become an adept in a few months. He cannot gain valuable knowledge without a clear conception of his duties and a determination to go forward until that goal has been attained. This will not be reached without many trying obstacles, and to meet these fearlessly and boldly means that his lot is not a path strewn altogether with roses.

The Apprentice of Old.

In the old days an apprentice was placed under a master who was often very exacting and who demanded such labor as was of the kind that brought out the best that he possessed. If the labor was arduous, it was beneficial, in so much that it taught the young man the real importance of his task, and in this way he learned each day's duties in a way that was not forgotten. Every detail was brought out, and its importance was duly impressed upon his mind, and he was shown the reason for its necessity in a way that could not be overlooked. His hours were often long, and the years of his early training were such that when he emerged from the care of his master he was able to do his work in a manner that assured care and accuracy, and he commanded such wages and labor as were in keeping with his services. If he did not work to an end, it was only from a lack of ambition, and not because he had not been trained to do his work well.

It is true that in those days there was very little labor saving machinery, and practically all the work was done by hand. But this fact has not changed conditions so much that a man does not require a careful conception of the duties that lie before him in any labor. In fact, there has been such a change in the methods of construction work, and the requirements are now so much more exacting, that one must be able to specialize in his work, and to do this demands care and knowledge. More care is demanded of a workman to-day, and the materials with which he labors are so intricate and the work requires so much nicety that a poor workman is only employed on a poor contract. If a young man is content to work for a trifle a day, a salary that will be paid to the most ordinary laborer, then there is no need of his seeking any higher knowledge or any more particular training in any line of work.

To become an expert in any line of work there are some important requisites essential. Every man will not be a genius, nor will every man attain superior skill in his work; but no one will even attain a fair degree of efficiency without particular pains. What does this not entail? Can any one hope to reach beyond his present position without, first, self-possession, and then training? Self-possession in this respect means industry, sobriety and regard for time. Training means a watchfulness and a striving that will be of the kind that proves actual results after a day's labor. These are possible, and they are vitally important to the young man who is entering upon his career as a contractor, carpenter or builder.

Properly training for a better position in life comes with theory and practice. Each are essential to the complete knowledge that means a man fitted for any occupation above that of a laborer, and to the young man who aspires for this goal there are wide and honorable opportunities. He must not give all his time to labor, but he must likewise consider that there are times when pleasure must give way to thoughts and occupations that make for a more useful period in his existence. If a man is content to let his fellow workmen strive ahead of him, if he is willing that they march on and leave him to become the drone, then he will soon learn that there is no one who will worry about this idea being carried out to the fullest. He must think and act for himself. He must labor with an aim in view, and then there will be the satisfaction of a reward for work well and honestly done.

Why Many Fail of Success.

So many young men fail to gain greater achievements because they are considering the time of day and what they will do when the quitting hour comes. They are uninterested in the work before them, and are satisfied that they have done well enough when they have got through without a reprimand. They work with less intelligence than a machine, and when the day is done they leave their occupation without a thought for the morrow. They do not carry away with them a newer idea; they do not feel that there is anything further to do than to complete the tasks before them and begin at something else as soon as possible. Their minds are engrossed with thoughts that are far away from an idea that will work to their greater good in this way.

There is need for more training in this way. There is a growing need for the laborers who can do things and who can do them well. A good workman can always secure a good position at good wages. He can always find willing hands to help him upward, because there is a crying need for those who are able to do whatever is demanded of them in a manner that will insure results.

Building Trades Demand Experts.

The building trades of to-day are demanding experts. The day of the haphazard workman has passed away, and in his place there has arisen skilled artisans—those who are so well trained in their particular work that they can be relied upon to do it well, and without the possibility of failure. We are building to-day along entirely different lines. We are building structures that require more artistic finishes, and there must be finished workmen to take up these portions of the work and carry them to completion. Are there enough of this class of mechanics? Are there a sufficient number of good men who have been trained to do their special kind of work well and who can be had without difficulty?

Never in the history of the world has there been a greater call for skilled artisans, and the fact should be impressed upon the minds of those who are coming into manhood and who are to take their places among the operators that are now making possible their betterment in the world of structural arts. There is a lesson to be learned and those who care to study it have opportunities that should be grasped with great fervor and so fit themselves for a goal that means a higher ideal in structural art and positions that mean something above the commonplace.

AN idea of the extent to which bungalows are being erected in Southern California may be gained from the statement that in different sections in the neighborhood of Los Angeles, one concern has under way more than 50 buildings of this type.

A BUNGALOW FOR A FLORIDA TOWN.

AMONG the many designs submitted in the recent bungalow competition conducted under the auspices of this journal were several from various Southern sections of the country, and embodying features which, in the estimation of the Committee of Award, entitled them to "honorable mention." One of these from a competitor in the State of Florida we illustrate herewith, the plans showing the general arrangement of the rooms, while the elevations and details indicate the construction employed.

According to the particulars which we have it was the idea of the author that the bungalow be erected for permanent occupancy on a corner lot in a suburban district of a Florida town. The exterior was to be shingled, as indicated on the elevations with rough cast plaster in panels in the gables. The front porch and pergola floors were to be laid with small paving tile in black and white checker pattern, while the interior was to be finished with the best quality yellow pine, and given one coat of paste wood filler and two coats of prepared wax. It is pointed out that the owner may substitute red oak floors and trim in the living room, dining room, chambers and bathroom, if so desired, but in the section in which the author of the design resides yellow pine is used almost exclusively, and it is for this reason that he thought best to specify it.

The foundation walls, piers and chimney are to be of good quality sand and lime brick, the outside face brick being selected and laid up in lime and cement mortar. The flues are to be lined with terra cotta flue lining. The porch and pergola steps are to be of paving brick and the floors are to be of the material and pattern described above.

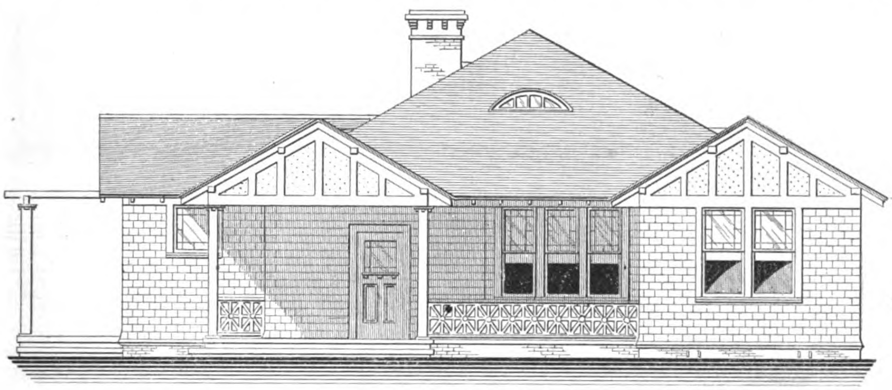
All lumber is to be of yellow pine, the floor joist being 2 x 8 in., the ceiling joist 2 x 6 in. and the studs 2 x 4 in., all placed 20 in. on centers. The rafters are to be 2 x 4 in., placed 24 in. on centers. The exterior walls and roof are to be covered with cypress shingles laid on shingle lath, spaced 7 in. on centers.

The living and dining rooms are to have a sub-floor with a finish floor of quarter sawed yellow pine. The other floors are to be of yellow pine. The joist are to have one row of cross bridging in each span. The mantel in the living room is to be of press brick and the floor in the cellar is to be of cement.

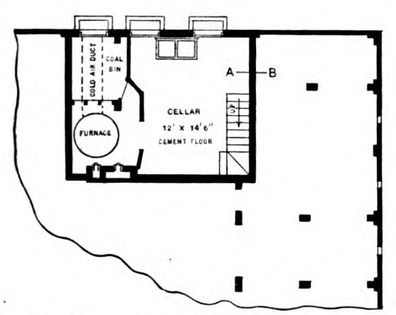
The kitchen porch is to be ceiled, as is also the servant's room, and the yellow pine sash throughout the building are to be glazed with double strength glass.

The rooms on the first floor are to be plastered with two coat work, the cellar being left unfinished. The kitchen and bathroom are to have a Keene cement plaster wainscot 4 ft. high marked off to indicate tile 5 x 5 in. in size.

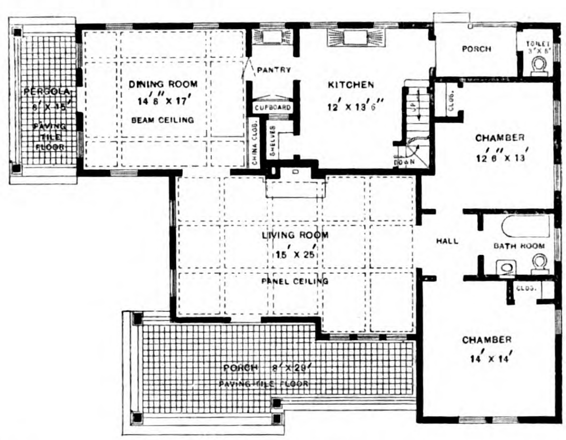
The exterior woodwork is to be given two coats of



Front Elevation.—Scale, 3-32 In. to the Foot.



Partial Foundation, Showing Extent of Cellar.—Scale, 1-16 In. to the Foot.



Floor Plan.—Scale, 1-16 In. to the Foot.

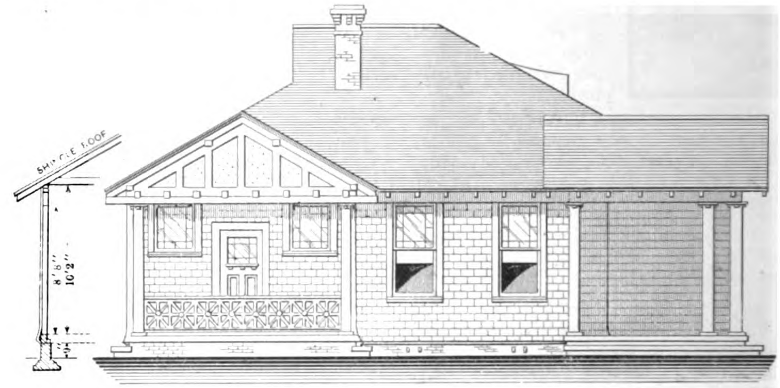
A Bungalow for a Florida Town.—Jefferson D. Powell, Architect, Jacksonville, Fla.

paint and the shingles are to have two coats of stain. All interior woodwork, except in the kitchen, pantry, toilet and bathroom floor, is to have one coat of paste wood filler and two coats of wax. The woodwork in the kitchen, pantry and toilet, except the floors, is to have two coats of paint. The cement wainscot is to have two coats of paint and one coat of white enamel.

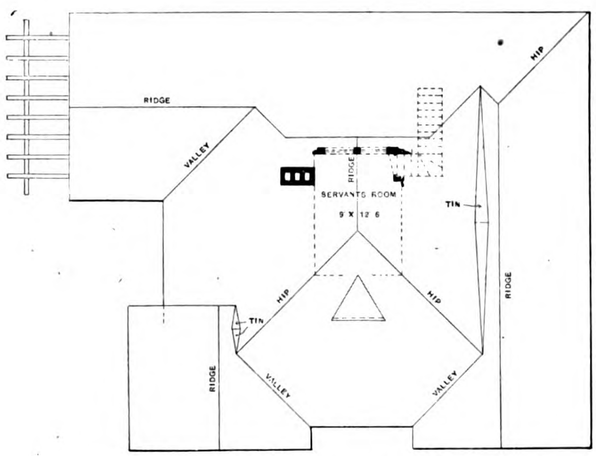
The bungalow is to be heated by means of a hot air furnace and the plumbing is to be of the open type. The bathroom is to be equipped with tub, washbowl and closet, with fittings complete.

The following interesting particulars relative to the cost of labor and materials in connection with this bungalow accompanied the descriptive data:

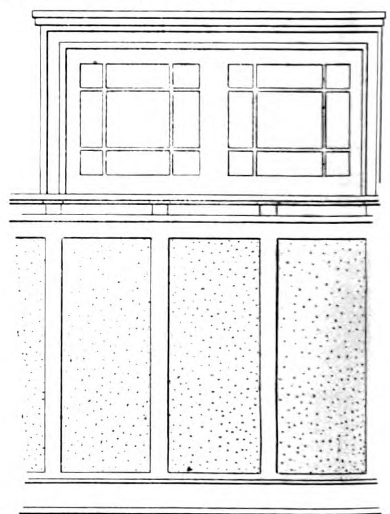
Section of Cellar Wall on Line A B of Plan.—Scale, ¼ In. to the Foot.



Section and Side (Left) Elevation.—Scale, 3-32 In. to the Foot.



Roof Plan with Outline of Attic Room.—Scale, 1-16 In. to the Foot.



Detail Showing Plate Rack and China Closet in Dining Room.— Scale, ⅜ In. to the Foot.

A Bungalow for a Florida Town.—Elevation, Roof Plan and Miscellaneous Constructive Details.

DETAILED ESTIMATE OF COST.

Current rate of wages, per day of eight hours, for various trades:

Brick masons	$4.00
Carpenters	2.40
Common helpers	1.20
Lathers	2.25
Plasterers	4.00
Plasterers' helpers	1.50
Plumbers	4.00
Plumbers' helpers	1.20
Painters	2.40

EXCAVATING AND FILLING.

100 yd. excavating, at 15 cents per yard $15.00

Filling.—The filling will be done with the excavated dirt, and will cost practically nothing.

MASON WORK.

17,000 sand and lime common brick, $14 per M laid	$238.00
2,000 sand and lime face brick, $16 per M laid	32.00
600 paving brick, $32 per M laid	19.20
30 sq. yd. of cement cellar floor, per yard, $1	$30.00
31 sq. yd. of paving tile, per yard, $1.10	34.10
60 lin. ft. 8 x 12 in. flue lining, per foot, 15 cents	9.00
2 stove pipe thimbles	.20
1 furnace pipe thimble	.15
2 iron ash pit doors, 50 cents each	1.00
Total of mason work	$363.65

CARPENTER WORK.

	Feet
184 lin. ft. sill, 6 x 8 in.	736
60 lin. ft. sill, 6 x 6 in.	180
60 lin. ft. stair carriage, 2 x 12 in.	120
1,200 lin. ft. floor joist, 2 x 8 in.	1,600
1,320 lin ft. ceiling joist, 2 x 6 in.	1,320
150 lin ft. rafters, 2 x 6 in.	150
1,600 lin. ft. rafters, 2 x 4 in.	1,065
3,500 lin. ft. studding, 2 x 4 in.	2,333
110 lin. ft. porch plates, 2 x 6 in.	110
800 lin. ft. plates, 2 x 4 in.	534
150 lin. ft. cleats on sills, 2 x 3 in.	75
200 ft. No. 1 Y. P. shiplap, 1 x 8 in., for cellar partition	200
700 ft. No. 1 Y. P. shiplap, 1 x 6 in., for subfloor	700
400 lin. ft. bridging, 1 x 3 in.	100
2,500 lin. ft. shingle lath, 1 x 3 in. on walls	625
3,800 lin. ft. shingle lath, 1 x 3 in., on roof	950
Scaffolding, &c.	400
Total of framing lumber	10,198

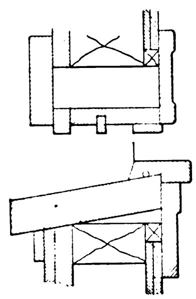
200 lin. ft. cornice boards, ⅞ x 13¾ in.	234
200 lin. ft. cornice boards, ⅞ x 5¾ in.	100
210 lin. ft. exterior finish, ⅞ x 7¾ in.	140
52 lin. ft. exterior finish, ⅞ x 5¾ in.	25
56 lin. ft. exterior finish, 1¼ x 5¾ in.	32
72 lin. ft. interior finish, ⅞ x 9¾ in.	60
56 lin. ft. gable beams, 5¾ x 5¾ in.	168
20 lin. ft. pergola beams, 5¾ x 5¾ in.	80

72 lin. ft. pergola beams, 4¼ x 5¾ in.............	156
54 lin. ft. attic stair treads, ⅞ x 10¼ in...........	48
48 lin. ft. attic stair risers, ⅞ x 7¾ in............	32
250 lin. ft. door jambs, ⅞ x 5½ in.................	120

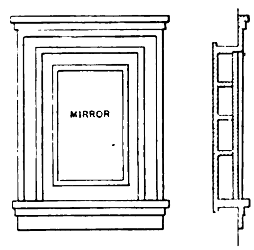
11,000 ft. framing lumber, $16 per M.................	$176.00
1,300 ft finished lumber, $26 per M................	33.80
9,900 No. 1 cypress shingles, on walls, $4 per M.......	39.60
16,100 No. 1 cypress shingles, on roof, $4 per M.......	64.40
2,600 ft. No. 2 Y. P. beaded ceiling, ¾ x 3 in., $18 per M.	46.80
360 ft No. 2 Y. P. flooring, ⅞ x 3½ in., $18 per M...	6.50
820 ft. No. 1 Y. P. flooring, ⅞ x 2½ in., $26 per M...	21.30
660 ft. No. 1 Y. P. quarter sawed flooring, ⅞ x 2 in., $50 per M..........................	33.00

MILL WORK.

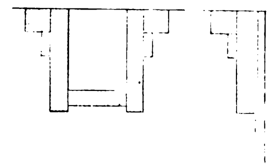
6 porch columns, $2.50 each.....................	$15.00
32 lin. ft. balustrade, 40 cents per foot............	12.80
150 lin. ft 2-in. exterior base mold, 70 cents per 100 ft.	1.05
100 lin. ft. 2-in. porch crown mold, 70 cents per 100 ft.	.70



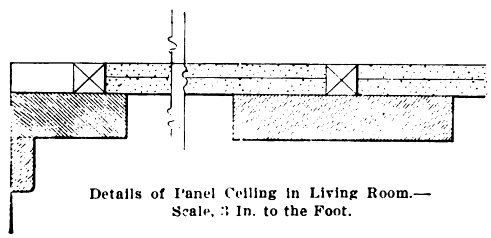
Vertical and Horizontal Sections Through Window Frame.—Scale, 1½ In. to the Foot.



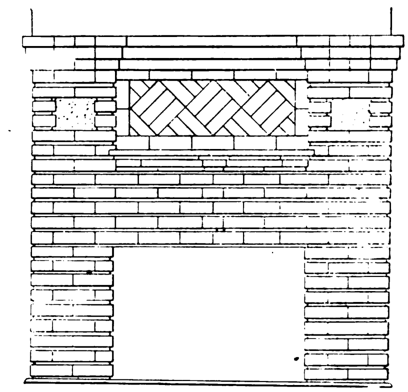
Elevation and Section of Medicine Closet in Bathroom.—Scale, ⅜ In. to the Foot.



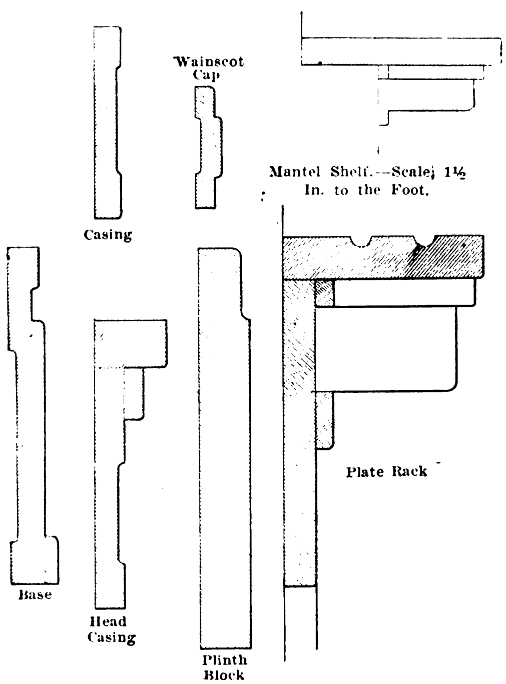
Detail of Beam Ceiling.—Scale, 1½ In. to the Foot.



Details of Panel Ceiling in Living Room.—Scale, 3 In. to the Foot.

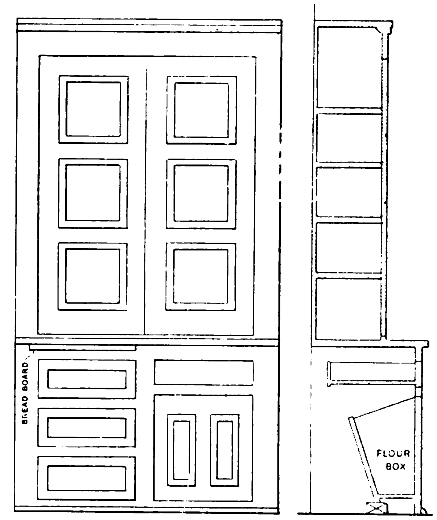


Detail of Mantel in Living Room.—Scale, ⅜ In. to the Foot.



Mantel Shelf.—Scale, 1½ In. to the Foot.

Details of Inside Finish and of Plate Rack.—Scale, 3 In. to the Foot.



Elevation and Section of Pantry Cupboard.—Scale, ⅜ In. to the Foot.

Miscellaneous Constructive Details of a Bungalow for a Florida Town.

124 lin. ft. panel ceiling, 1⅛ x 5¾ in..............	70
96 lin. ft. panel ceiling, wall piece 1⅛ x 3¼ in......	32
Total of finished lumber........................	1,299

450 ft. ceiling boards for cornice.
450 ft. ceiling boards for porches.
880 ft. ceiling boards for closets.
100 ft. ceiling boards for kitchen.
320 ft. ceiling boards for attic and cellar stairs.
300 ft. ceiling boards for servant's room.

2,500 ft.

200 lin. ft. ⅞-in. quarter round, 35 cents per 100 ft..	.70
2,000 lin. ft. ¾-in. grounds, 20 cents per 100 ft........	4.00
1 cellar window frame, 2 ft. 6 in. by 2 ft. 10 in........	1.00
2 cellar window frames, 1 ft. 10 in. by 2 ft. 10 in., $1 each	2.00
5 window frames, 2 ft. 10 in. by 6 ft. 2 in., $1.35 each..	6.75
1 window frame, double, 2 ft. 10 in. by 6 ft. 2 in.......	2.75
1 window frame, triple, 2 ft. 4 in. by 6 ft. 2 in........	3.00
1 window frame, 3 ft. 4 in. by 6 ft. 2 in..............	1.35
3 window frames, 2 ft. 10 in. by 5 ft. 8 in., $1.35 each..	4.05
1 window frame, 2 ft. by 3 ft. 8 in..................	1.25
5 window frames for single sash, 2 ft. 10 in. by 3 ft. 2 in., $1.25 each..............................	6.25

1 eyebrow dormer frame, 16 in.	$5.00
1 window frame, double, for attic gable	3.00
2 door frames, 2 ft. 10 in. by 7 ft., $1.35 each	2.70
1 door frame, 3 ft. 2 in. by 7 ft.	1.85
1 door frame, 2 ft. 4 in. by 6 ft. 8 in.	1.25
3 cellar sash, two lights, glazed, 1 ft. 10 in. by 2 ft. 10 in., 75 cents each	2.25
7 windows, glazed, 2 ft. 10 in. by 6 ft. 2 in., $2 each	14.00
3 windows, glazed, 2 ft. 4 in. by 6 ft. 2 in., $1.75 each	5.25
1 window, glazed, 3 ft. 4 in. by 6 ft. 2 in.	2.50
3 windows, glazed, four lights, 2 ft. 10 in. by 5 ft. 8 in., $1.35 each	4.05
1 window, glazed, 2 ft. by 3 ft. 8 in.	1.10
5 windows, glazed, single sash, 2 ft. 10 in. by 3 ft. 2 in., $1.40 each	7.00
1 sash, two lights, glazed, 1 ft. 4 in. by 2 ft. 2 in.	.70
1 eyebrow dormer sash, glazed, 16 in.	3.00
2 sash, two lights, glazed, for attic gable	1.20
1 dining room door, glazed, 2 ft. 10 in. by 7 ft. by 1⅜ in.	5.00
3 doors, 2 ft. 10 in. x 7 ft. by 1⅜ in., $2.25 each	6.75
1 front door, glazed, 3 ft. 2 in. by 7 ft. by 1⅜ in.	7.00
3 doors, 2 ft. 8 in. by 7 ft. by 1⅜ in., $2.10 each	6.30
7 doors, 2 ft. 4 in. by 6 ft. 8 in. by 1⅜ in., $2 each	14.00
620 lin. ft. casing, $2 per 100 ft.	12.40
200 lin. ft. head casing, three members, $3 per 100 ft.	6.00
70 lin. ft. stool and apron, $2.50 per 100 ft.	1.75
600 lin. ft. window and door stops, 50 cents per 100 ft.	3.00
48 lin. ft. thresholds, $1.50 per 100 ft.	.72
300 lin. ft. base, two members, $3.50 per 100 ft.	10.50
64 lin. ft. wainscot cap, $1 per 100 ft.	.64
400 lin. ft. picture mold, 50 cents per 100 ft.	2.00
48 plinth blocks, 6 cents each	2.88
53 lin. ft. plate rack, 18 cents per foot	9.54
66 lin. ft. beam ceiling, 13 cents per foot	8.58
66 lin. ft. beam ceiling, wall course, 6 cents per foot	3.96
Mantel shelf	.75
Medicine closet	5.00
Pantry cupboard	25.00
China closet	15.00
Total cost of carpenter material	$685.17

Total cost of working framing lumber	$106.50
Total cost of working finished lumber	92.50
Total cost of putting shingles on walls and roof	74.00
Total cost of setting and fitting window frames and windows, door frames and doors	19.75
Total cost of working porch columns, balustrade, base mold, porch crown mold, quarter round and interior grounds	12.00
Total cost of working interior trim, plate rack, beam ceiling, panel ceiling, picture mold, &c.	63.70
Total cost of carpenter work	$368.45

LATHING AND PLASTERING.

10 yd. of metal lath, 14 cents per yard	$1.40
510 sq. yd. of lathing and plastering, two-coat work, 27 cents per yard	137.70
20 sq. yd. of lath and Keene cement plaster wainscot, two-coat work, 30 cents per yard	6.00
8 sq. yd. of rough cast plaster, two coats, $1.50 per yard	12.00
Total cost of lathing and plastering	$157.10

PAINTING.

400 sq. yd. of painted surface, 20 cents per yard	$80.00
86 gal. shingle stain, 70 cents per gallon	60.20
60 lb. paste wood filler (Johnson's)	8.00
10 lb. prepared wax, 60 cents per pound	6.00
20 sq. yd. white enamel, ½ gal.	1.75
2 gal. turpentine	1.40
Cost of labor for staining shingles	37.00
Cost of labor for interior filling and finishing	30.00
Total cost of painting, &c.	$224.35

HARDWARE.

General hardware, window and door trimmings, sash cord, weights, &c.	$30.00
Nails	18.00
Total cost of hardware	$48.00

PLUMBING.

(Estimate by local contractor.)

Fixtures.

Bathtub, complete	$35.00
Wash bowl, complete	18.00
Kitchen sink, complete	25.00
Pantry sink, copper	8.00
Water closet in bathroom	30.00
Water closet in toilet	15.00
Laundry tubs	20.00
Hot water boiler	19.00
Total cost of fixtures	$170.00

Fixtures	$170.00
Piping, &c.	50.00
Labor	47.00
Tin work, flashing, &c.	5.00
Total cost of plumbing	$272.00

HEATING.

Furnace	$95.00
Placing and setting up	5.00
Heating pipes, registers, &c.	31.00
Cold air duct, complete	5.00
Labor	14.00
Total cost of heating	$150.00

RECAPITULATION.

Excavating and filling	$15.00
Mason work	363.65
Carpenter work and materials	1,053.62
Lathing and plastering	157.10
Painting	224.35
Hardware	48.00
Plumbing	272.00
Heating	150.00
Total cost	$2,326.00

The bungalow here shown was designed by Jefferson D. Powell, 1238 Hubbard street, Jacksonville, Fla.

Future of the Lumber Trade.

During the recent discussions anent the revision of the building code, the keynote was the fireproof building. The sentiment was conspicuous that wood should be barred from all structures purporting to be fireproof, and the question was asked, says a recent issue of the *Record and Guide*, "What is to become of the lumber business of New York?"

It is apparent that with improvement in building construction and the introduction of compositions designed to take the place of wood, whether for trim, doors, door frames, window frames and even of flooring, lumber, as an integral part of a modern office, mercantile or industrial building, hotel, theater or residence, is being slowly relegated to the rear. But while this is in part true it is not entirely so.

All the legislation that a municipal body could enact in extending fireproof construction would not cripple the local companies to the extent of driving them from business, neither would it have any greater depreciatory effect upon lumber interests than they have already sustained. Any lumberman will say that the day of big profits in lumber have passed—that is, in so far as city business is concerned. Even in the country districts it is not the remunerative enterprise it once was reputed to be. Competition with fireproof materials is responsible for this change.

What is the stock almost universally carried to-day? True, there is some of the old stock that had been carried for years, like clapboards, rafters, &c. Lath is carried in much less quantity. Where these used to be piled high there are to-day stored huge piles of 12 x 12 timbers and sizes in that range, while there are tremendous stocks of pine of the long leaf yellow variety of 1-in. boards and 1¼ and 2 in. boards. Shingles were almost a negligible quantity. All of this plank is dressed on one side only. There is, however, usually to be found a good supply of hardwoods for flooring purposes.

Reinforced concrete is the savior of the lumber trade to-day. When it is considered that a building of ordinary size being erected at Fifth avenue and Seventeenth street required $35,000 worth of lumber for bracing and making concrete molds for reinforced concrete flooring and other concrete work, it shows why 2 and 1 in. planking is so much in demand. In some cases this can be used over again, but usually it costs more to reshape the molds with old lumber than it does to break up and sell the old molds and buy new for new jobs.

In reinforced concrete work the popular lumber is 1¼ and 2 in. spruce planks dressed on one side. In New York, where a large percentage of reinforced concrete work is for floors, 1-in. North Carolina pine is generally used.

Without doubt the future of the lumber business in or near this city is in the suburbs. New Jersey offers a good field, because its building laws are not so insistent upon the absence of wood in ordinary types of fireproof construction, but, on the other hand, the field is well covered by hustlers who are developing their trade there in exact proportion with the growth of the municipalities.

SOME INTRICATE PROBLEMS IN FRAMING.—VII.

BY C. J. MCCARTHY.

WE now approach the concluding phase of our serial article dealing as it does with angle brackets adapted for a variety of purposes. Referring to Fig. 38 of the accompanying diagrams let C A B represent the bracket of the cove. In order to find the angle bracket we proceed as follows: First, when it is a miter bracket in an interior angle, the angle which the bracket makes with the adjacent wall being 45 degrees, we divide the curve C B into any number of equal parts, as 1, 2, 3, 4, &c. Draw through the divisions the lines 1 *d*, 2 *e*, 3 *f*, &c., perpendicular to the line A B, and cutting it in the points *d*, *e*, *f*, *g*, *c*, and produce them to meet the line D E, representing the center of the angle bracket. From the points of intersection *h*, *i*, *k*, *l*, *c*, draw the lines *h* 1′, *i* 2′, *k* 3′, *l* 4′ at right angles to D E and make them equal—*h* 1′ to *d* 1, *i* 2′ to *e* 2, *k* 3′ to *f* 3, &c., and through *f* 1′, 2′, 3′, 4′, 5′ draw the curve of the bracket.

The lines on each side of D E represent the thickness of the bracket, and the dotted lines *u r*, *v s* and *w t* show the manner of finding the bevel of the face. In the same figure is shown the manner of finding the bracket for an obtuse exterior angle. Let D I K be the exterior angle, bisect it by the line I G, which will represent the seat of the center of the bracket. The lines I H, *m* 1″, *n* 2″, *o* 3″, *p* 4″, *c* 5″ are drawn perpendicular to I G, and their lengths are found as in the former case.

The manner of finding the angle bracket of a cornice for interior and exterior—otherwise re-entrant and salient—angles is shown in Fig. 39 of the drawings. Referring to this figure let A A A be the sectional elevation of the cornice bracket, E B the seat of the miter bracket of the interior angle and H G that of the miter bracket of the exterior angle. From the points A, *k*, *a*, *b*, *c*, *d*, A, or wherever a change in the profile of the bracket occurs, draw lines perpendicular to A *i* or D *c* cutting A *i* in the points *e*, *f*, *g*, *h*, *i* and cutting the line E B in the points E, *l*, *m*, *n*, *o*, B. Draw the lines E G, G L and B H and H K, representing the plan of the bracketing; also draw the parallel dotted lines from the intersections *l*, *m*, *n*, *o*. Now make B F and H I equal to *i* A; make *o u* equal to *h d*; make *n t* equal to *g c*; make *m s* equal to *f b*; make *l r* equal to *e a*, and make *l p* equal to *e k*. Join the points thus found and the result will be the contour of the brackets required. The bevels of the face are found as shown by the dotted lines *x v* and *y w*.

The manner of finding the angle bracket at the meeting of a concave circular wall with a straight wall is clearly indicated in Fig. 40, where A D B E represents the plan of the bracketing on the straight wall; D M E G the plan on the circular wall; C A B the elevation on the straight wall, and G M H the elevation on the circular wall.

Divide the curves C B and G H into the same number of equal parts. Through the divisions of C B draw the lines C D, 1 *d h*, 2 *e i*, 3 *f k*, &c., perpendicular to A B. Through the divisions of G H draw the parallel lines, part straight and part curved, 1 *m h*, 2 *n i*, 3 *o k*, &c., then through the intersections *h*, *i*, *k*, *l* of the straight and curved lines, draw the curve D E which will give the line from which to measure the ordinates *h* 1, *i* 2, *k* 3, &c.

In Fig. 41 is shown the manner of finding the angle bracket when the wall adjoining the straight one is a convex curve. Let B E D C represent the plan of the bracketing on the straight wall and B E G H the plan on the curved wall. From the points A, *k*, *a*, *b*, *c*, *d*, A of the bracket A A A, where the changes in its profile occur, draw the perpendiculars as before. Draw H G radial to the curve of the wall H B and set out on it the divisions *o*, *n*, *m*, *l* equal and corresponding to *h*, *g*, *f*, *e* of the elevation A A A. Draw H I, *o u*, *n t*, *m s*, *l r* and *l p* perpendicular to G H and make them equal to *i* A, *h d*, *g c*, *f b*, *e a* and *e k* of the elevation; then join the points by the lines I *u*, *u t*, *t s*, *s r*, *r p* and *p* G to obtain the contour or profile of the bracket equal and corresponding to A A A. Through the points *o n*, *m l* draw concentric curves meeting the perpendiculars drawn from corresponding points of A A A. From the intersections of the straight and curved lines *o*, *n*, *m*, *l* draw the lines B F, *o u*, *n t*, *m s* and *l r* perpendicular to E B and make them equal to the corresponding lines of the elevations as before. After this has been done join the points F, *u*, *t*, *s*, *r*, *p*, E to obtain the contour of the angle bracket.

The angle bracket of a cove where a straight wall joins a convex circular one is illustrated in Fig. 42, while in Fig. 43 is represented an angle bracket intersecting two coves of unequal projection. These will be readily

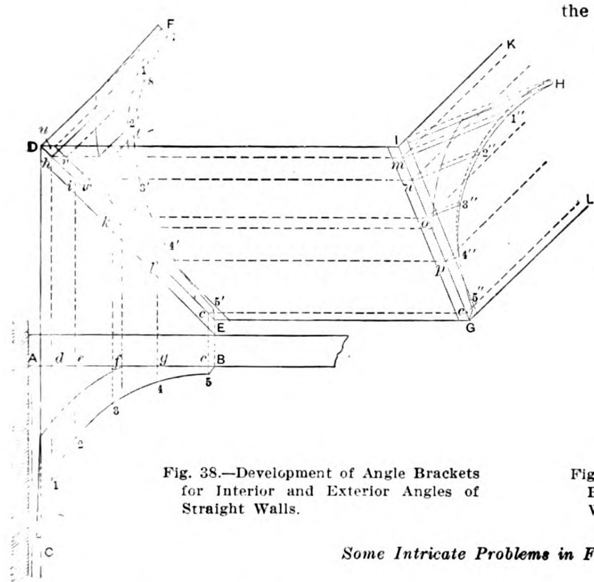


Fig. 38.—Development of Angle Brackets for Interior and Exterior Angles of Straight Walls.

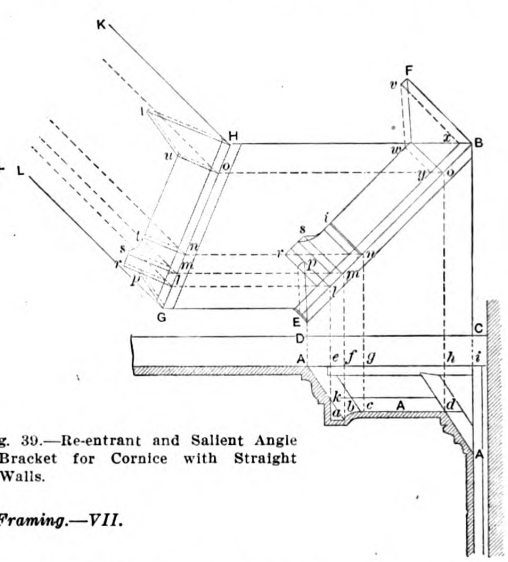


Fig. 39.—Re-entrant and Salient Angle Bracket for Cornice with Straight Walls.

Some Intricate Problems in Framing.—VII.

understood from an inspection of the diagrams, and do not call for special elucidation.

Painting and Finishing Cypress, Yellow Pine and Cottonwood.

At the recent convention of the International Association of Master Painters and Decorators of the United States and Canada, held at Baltimore, Md., a paper dealing with the above subject was read by S. J. Underwood, and as it contains much that is of interest to readers of this journal, we are presenting copious extracts herewith.

Yellow pine means little or may mean much, as the case may be. Generally speaking, this timber, on account of its stiffness and strength, is used for structural purposes, and no other wood approaches it in this regard. Clear heart long leaf yellow pine is the best of this kind of timber, is excellent for finishing purposes and can be painted or varnished with very fine results. On account of its resinous nature it will not absorb stain satisfactorily and is not used for this purpose.

Clear heart is very hard to get and is extremely expensive; so much so as to make its use almost prohibitive. The next lower grades are A & B finish, quite satisfactory, likewise expensive. For many years the manufacturers have been kiln drying the sappy portions of pine trees cut into lumber. In the South this material is called "kiln dried saps," and in the East from Charleston north is marketed under the name of "North Carolina pine." For certain kinds of interior finish it is quite satisfactory. When clear of knots and pitch it can be readily painted and it is sometimes stained or finished in the natural. If the wood is specially selected and a great amount of work put on it by the finisher, quite a nice looking job will result, but unless this is done its natural coarseness precludes its use for really high class purposes.

For the greatest variety of uses, combined with availability, high character and quality, cypress ranks high among the woods of to-day as a finishing lumber. For ease of working, straightness of grain, lightness and strength combined, and durability—everything considered, it has no equal. It is rapidly supplanting white pine for almost everything and those who have used the two now prefer cypress, claiming it superior for nearly all purposes. It is being used for all kinds of house joinery work, both exterior and interior. On account of its great durability and weather resisting qualities, it excels for exterior housework such as doors, window blinds, jambs, facings, porches, weather boarding, &c., and everyone knows that cypress shingles outlast all others. For interior finish its ease of working, straightness of grain, nonresinous nature, and the fine, wide, clear sizes obtainable makes it without doubt one of the best woods for this purpose. For exterior or interior purposes it can be painted with entire satisfaction and perfect results. On account of the beauty of its grain and variety of its rich shadings it is a pity when used for interior work to hide its charms under a coat of paint or stain, and I would recommend that it be varnished and finished in the natural. Should it be desired to stain it, this can be done most successfully in imitation of mahogany, rosewood, cherry, black walnut, the different oaks, or tinted any desired shade the most fastidious fancy may dictate.

Regarding the painting of cottonwood, yellow pine and cypress, I will treat the matter as if I were painting cypress. Practically the same directions apply for each of the three woods. The supposition is that we are to work on absolutely new work. In order to insure a good job of painting, the work should be well and smoothly made of good quality, well seasoned material. To get the best results all woodwork should be hand planed and finished, all nails should be punched below the surface, all bits of glue or other foreign substance removed and the wood smoothly sandpapered and dusted clean. Cypress being of a nonresinous nature and quite free from knots, requires no "knotting," but in case of pine all knots and pitchy streaks should be given a coat of shellac to prevent exudation.

The wood is then ready to be primed and the priming coat, mainly pure white lead and raw linseed oil with a small percentage of turpentine and drier. Never use common ochers for priming, as the work will never finish smooth. I advocate only the use of the best materials throughout, including priming. Start right and you can easily end right, but you can never make a good job if you begin wrong. The priming should follow the joiner as closely as possible—this is important and essential and it insures a smoother job, no matter what kind of wood is used. During priming, care should be taken to see that all holes and cracks get their full share of paint and that nail heads be painted to prevent rusting. When the primer has got fairly hard, stopping should be done. This is an operation simple in itself which demands care and attention in execution. Putty shrinks in drying and to prevent its sinking below the surrounding surface it should be pressed hard in the hole, leaving a slight fullness, which, when dry, will recede to the proper surface, or which may be easily sandpapered fair. After stopping and when the primer is thoroughly dry and hard, rub down slightly with fine

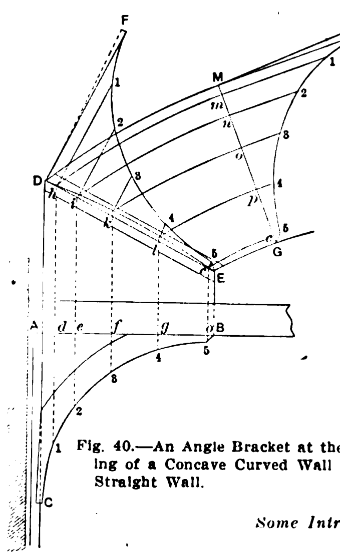


Fig. 40.—An Angle Bracket at the Meeting of a Concave Curved Wall with a Straight Wall.

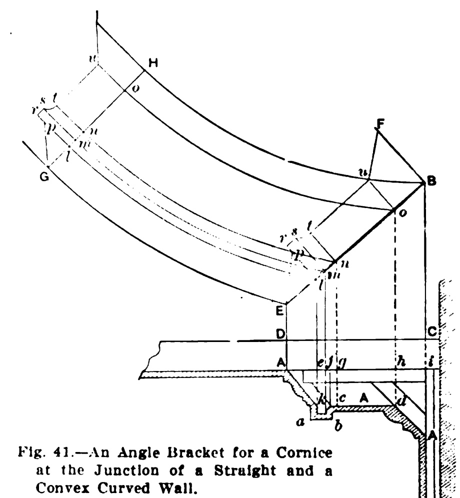


Fig. 41.—An Angle Bracket for a Cornice at the Junction of a Straight and a Convex Curved Wall.

Some Intricate Problems in Framing.—VII.

sandpaper, taking care not to rub off the corners or sharp edges of the work. The second coat of similar material to the first should then be applied.

I must call especial attention to the need of the utmost care in sandpapering or rubbing, and carelessness in this regard cannot be condoned. Caution must be exercised to preserve the sharp corners and the clean cut original shape of the quirks and moldings. On flat surfaces the workman should use sandpaper blocks and in the quirks and other places such blocks as will conform to the shape of the work. If the proper attention is given to this feature, the painter will be amply repaid by the satisfaction which comes only from contemplating a high class piece of work.

When the second coat is thoroughly hard and dry the third coat should be applied. Regarding the number of coats, a great many authorities differ. Many, as I do, contend that three coats of paint if well applied are sufficient. A great many more advocate not less than four coats, some even advocating as many as five. The theory of durability being that if three coats will wear better than two, four will wear better than three, and so on. My opinion in this matter is that we must be governed by the conditions affecting each particular job and be guided, of course, by the architect's specifications. No turpentine should be used in the last coat, only best quality raw linseed oil and drier.

Except in the priming the amount of paint put upon the work should be as little as can be properly and uniformly spread, and the paint should be well worked out. Two thin coats well brushed in are always better than one thicker one. Paint should never be too thin, and thick paint is even worse because it never thoroughly dries and always causes trouble. "Less paint and more painting" is an old saying and a mighty true one, and the personal equation is as true of painting as of anything else. It is just as essential and even more so to apply the paint right as it is to secure good material, and both are indispensable in first-class work. And further, a good workman will always give special attention to the proper coating of edges and such parts as crevices, beads and moldings, where dirt is liable to lodge and to prevent the incursion of water. It is of vital importance to properly paint these hidden parts and it is the foreman's bounden duty to see that it is done.

The duty of paint is to preserve, to keep clean and to beautify, and as a preservative its function is to protect wood from the weather and other injurious influences, besides taking the wear. In fact, for outdoor purposes, to preserve is its sphere more than to beautify. While it is a well known fact that heartwood will take paint better than sapwood (except in yellow pine, when the sapwood is thoroughly air dried or well kiln dried), the protective covering produced by a satisfactory well applied paint will render the sapwood practically as lasting as heartwood; this is for exterior as well as interior purposes. Railroad companies and other large corporations have already realized this and are to-day specifying to a more or less extent sapwood for their painted work, not only on account of being less expensive, but to save the more valuable heartwood for such purposes as sapwood cannot be used. Further, in this connection, architects can exercise more latitude in their specifications and may specify for fine work either heartwood or sapwood, if otherwise clear of defects, provided they will see to it that the work is well prepared and finished, and scientifically painted.

Regarding the painting of cypress for interior purposes, the best results can be obtained if the wood is first given a coat of spirit varnish made of white shellac and pure grain alcohol. This should be applied thin and afterwards smoothly rubbed down with fine sandpaper. The painting may then proceed as in the case of any other wood.

Where enameling is required first apply a thin coat of shellac and rub down with fine sandpaper; then apply a coat of pure white lead mixed half and half with raw linseed oil and turpentine and a little drier. When this is thoroughly dry and hard use a fine sandpaper and remove any roughness on the surface, being careful to preserve the corners and original shape of the work. Then give three coats of flat drawn white lead, sandpapering each coat when hard; then applying two coats of flat zinc and one coat each egg shell and enamel finish, rubbing all coats except the finish, which should be left in the gloss.

It is absolutely essential in order to make a good job to have the finished woodwork done in a first-class manner and to have perfectly clean, smooth surface, free from dust, finger marks or other impurities—a clean pot, a clean brush and a clean atmosphere. The room should be well swept and sprinkling should be done to allay dust, if any. Varnishing should be done in a warm atmosphere, which should not be less than 70 degrees F. Only those who know can appreciate the importance of these injunctions, and failure to observe them is certain to result in disappointment.

The varnishes should be the best of their respective kinds, from well known and reliable makers, and on no one job should varnish of different makers be used. Exterior varnish should always be used on outside work and interior varnish on all inside work. Inattention to these details has frequently spoiled what otherwise might

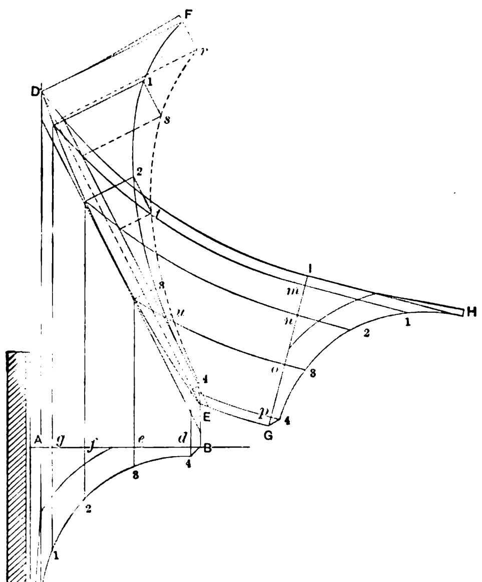


Fig. 42.—An Angle Bracket for a Cove at the Junction of a Straight and a Convex Curved Wall

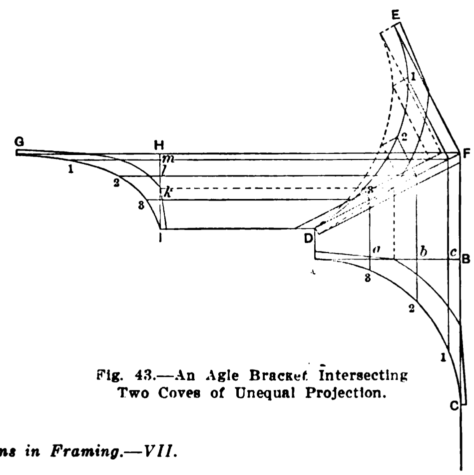


Fig. 43.—An Agle Bracket Intersecting Two Coves of Unequal Projection.

Some Intricate Problems in Framing.—VII.

have been excellent jobs. Cheap varnish should never be used on high class work.

When cypress is to be finished in the natural it should, except on exterior work or where exposed to more or less water, as in bathrooms, in which case no shellac should be used, first be given a coat of fairly thin spirit varnish made from pure grain alcohol and white shellac. This should be rubbed down with 0 sandpaper and afterwards given two or three coats of transparent varnish—three coats on all outside work—allowing at least 48 hr. for each coat to dry. Each coat should be rubbed with very fine sandpaper, curled hair or moss before applying the next coat. If a bright finish is desired leave the final coat glossy and if a dull finish is required let the last coat stand and harden three or four days; then rub down carefully with fine pumice and water.

The above directions will answer for cottonwood and yellow pine; in fact, the United States Government's specifications are practically identical with the above excepting that no distinction is made between orange or white shellac. My opinion and experience, however, is that orange shellac gives the finished work a yellowish tinge which is undesirable. The peculiar nature of cypress requires something in the nature of a shellac or spirit varnish to seal its surface and make it receptive for fine varnish work. As doctors frequently differ in the treatment of similar cases, so do authorities differ on the finishing of cypress, and some say that it should not be shellacked at all. My opinion is that colorless shellac varnish makes a most satisfactory sealer when applied thin and lightly sandpapered, but one of the largest manufacturers in the country, who has given considerable attention to cypress, claims that no shellac at all should be used on the wood, but that the best results are obtained by using his cypress sealer, which is claimed to be superior.

I wish to caution particularly against the application of straight oil direct to the surface of any wood which is to be finished in the natural. This is very important, as oil has the effect of muddling the grain of the wood and of giving it a murky, dirty looking appearance.

There are oil stains, water stains, acid stains, spirit stains, &c. In my opinion oil stains are preferable, as they do not tend to raise the grain of the wood. Water stains are quite satisfactory if applied quickly and rubbed in well with a piece of cheesecloth to prevent the wood absorbing too much moisture. If you make your stains of good materials, or else get those stains made by reliable manufacturers and follow directions, you will never go wrong. When the stain is dry apply one coat of fairly thin shellac or sealer and rub smooth with fine sandpaper, afterwards applying two coats of transparent interior varnish as previously directed.

In conclusion, I wish to touch on one phase of this subject, creosote stains, which are now being made on a large scale by some of our leading manufacturers, in any desired color or shade. I have used them myself with entire satisfaction both from an artistic standpoint and from a standpoint of durability, as these stains seem to penetrate the wood deeper than paint. They offer a variety of rich shadings, revealing the natural grain of the wood—a most pleasing effect not to be attained by painting. They are used equally as well on shingles, whether for roofs or gables, or for weather boarding, including window facings and blinds; in fact, for all outside trimmings.

For shingles I unhesitatingly recommend dipping (at least three-fourths of the length of the shingle), as the stain more thoroughly impregnates the wood. One man can easily dip about 8000 shingles per day, so it will be seen that it is not a very expensive operation. For the weather boarding the stains must be brushed in and two coats should always be applied both for durability and depth of color. I also recommend that the shingles which were dipped be given an additional brush coat as well, as this not only adds permanence to the color, but gives one an opportunity to retouch the raw edges where the shingles may have been cut to fit the work.

The American Society of Engineering Contractors has accepted an invitation from the Cement Products Exhibition Company to hold its next annual convention in Chicago during the third annual Cement Show, February 18 to 26, 1910.

Architects Should Have Practical Training.

It is contended by not a few who are best able to express an opinion on the subject that if the rising generation of architects will study to combine with the practice of architecture a more practical acquaintance with the various branches of the building industry, and endeavor to familiarize themselves more closely with the general principles of the construction which they are called upon to supervise, the result will be the construction of much better buildings than are now being erected, says a writer in the *Contract Record*. At a recent professional gathering a prominent architect made the following remarks:

Architects should be practical builders, and should have an exact and thorough knowledge of building. How is an architect to supervise the construction of a building he has designed, with any justice to himself or the owner, if he is not thoroughly informed in regard to building? There are many so-called architects who are merely draftsmen, who can make a pretty picture, but who have not the practical knowledge of the building trade which makes them sure of themselves when it comes to erecting the building they have designed on paper. In my opinion, all architects should have practical training as builders, either before they take the course in the architectural schools or after they have finished that course. If the law required the architect to be a practical builder, as well as a draftsman, there would be no falling down of buildings.

Too often the architect's supervision is such only in name. It cannot be what it should be unless the architect is practically schooled in the principles upon which the building trade is founded. In many branches of engineering it is essential for the young engineer at the outset to learn the practical end from the ground up. If this is a *sine qua non* in the training of the engineer, how can the architect afford to sacrifice everything to theory? It is not enough for an architect to be able to get out a set of plans. He should be able to certify, of his own personal, practical knowledge, that the building in its several constructional features satisfies the most rigid requirements of modern science.

Suggestions for "Den" Decoration.

In a small, low ceiled room used as a den a quaint effect has been obtained by the use of a dado about 4½ ft. high made from a gorgeously figured Japanese matting turned sideways and covered at the bottom by the wainscot cap and at the top by a molding which forms the bottom member of the supporting band for a shelf, about 6 in. broad, that is carried on pairs of brackets at intervals, runs round the room and serves to support a collection of pottery and bric-a-brac gathered up in numerous trips out of the beaten pathways of travel, says *The Painters' Magazine*. The upper wall is made of a plastic relief compound, a greenish gray tone, put on through a wire mesh to give the effect of texture. This background has been divided into panels by flat oak moldings about 2½ in. wide. Long rectangular panels are surmounted by smaller square panels with diagonal pieces, the direction reversing in the adjoining panels to give the effect of diagonal bracing.

A broad chimney piece built of light red mottled brick rises to the hight of the wainscot shelf. The casement windows are made up of a series of diamond shaped pane set in wood muntins. The white plastered ceiling is divided into square panels by similar moldings to those on the upper walls.

The floor is of oak, stained dark and partially covered with a fluff rug woven like a rag carpet from pieces of old Brussels and ingrain carpets. The furniture is solid and heavy—broad armed splint chairs with loose cushions and a box divan heaped with gay sofa pillows and a large Mission table that serves as a writing desk.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—VIII.

By Edward H. Crussell.

SINCE the advent of the built-in bookcase, china cabinet, &c., the carpenter when making alterations or repairs is sometimes called upon to do work involving the construction of small glass doors and woodwork of a somewhat similar nature. In presenting information on this subject the writer has endeavored to make it more interesting by so arranging it that the student may, if he choose, obtain practical experience from it by constructing the article illustrated. The cost of material would not be great while the experience gained by any one not having previously done any of this class of work should be worth a great deal.

The small bookcase shown in the accompanying sketches is not a copy of any found in the furniture stores, but was designed especially to provide storage space for bound volumes of such papers as *Carpentry and Building*. The shelves are movable and may be arranged to take these volumes easily, while the drawer at the bottom will hold the monthly issues, preventing them from getting lost, and keep them clean until they are ready for binding or other disposition is made of them.

No. Pieces	What For	Thickness	Width	Length	Kind of Wood	No.
2	Ends	7/8"	12"	3' " 10"	¼ sawn oak	1
1	Top	7/8"	10½"	2' · 6¾	Plain oak	2
1	Shelf over drawer	7/8"	11⅜	2' " 6¾	"	3
1	Bottom	7/8"	11⅜	2' " 7½"	"	4
1	Drawer front	7/8"	5"	2' · 6¼"	¼ Sawn oak.	5
2	Door styles	7/8"	1¾"	3' " 0"	"	6
2	" "	7/8"	2⅛"	3' " 0"	"	7
2	" Rails	7/8"	2¼"	1' " 3"	"	8
2	" "	7/8"	1¾"	1' " 3"	"	9
1	Rail above door	7/8"	2"	2' " 6¾"	"	10
1	Cornice cap	7/8"	2¾"	4' " 6"	Plain oak	11
2	Book shelves	7/8"	10"	2' " 6"	"	12
1	Cornice moulding	7/8"	1¼"	4' " 6"	¼ Sawn oak	13
2	Drawer sides	½"	5"	10¾"	Pine	14
1	" Back	½"	4"	2' · 6¼"	"	15
1	" Bottom	⅜"	10½"	2' · 6¾	"	16
4	Styles for back	7/8"	2½"	3' " 8"	"	17
3	Panels " "	½	7½"	3' " 8"	"	18

Fig. 47.—Bill of Material, Showing Sizes of Various Pieces Required.

on it almost any slope or pitch desirable could be obtained.

The outside measurements of the bookcase are as follows: 12 in. deep, 2 ft. 8 in. wide and 3 ft. 10 in. high. Other dimensions are marked on the drawings, which are to scale. All the woodwork in sight should be good figured quarter sawn oak, while that for the back of the case and inside of the drawer may be of pine or other cheap material.

The first consideration will be the amount of lumber required. The best way to estimate this is to make out a bill of material showing the size of each individual piece. In a large job this bill of material is always a necessity, but even in a small job, such as the one at present under consideration, the lumber may be ordered of a size that will work up more economically if a proper bill of material is made out beforehand.

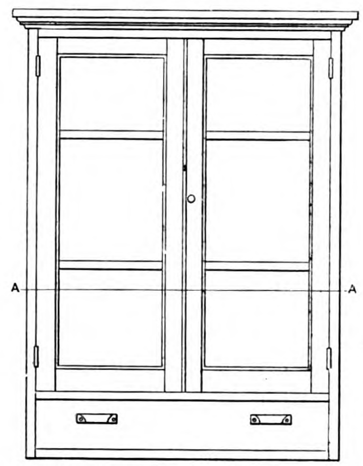


Fig. 48.—Front Elevation of Bookcase.—Scale, ¾ In. to the Foot.

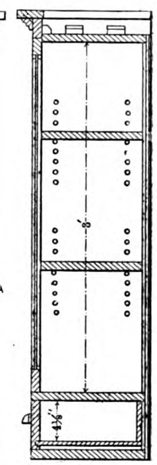


Fig. 49.—A Vertical Cross Section.—Scale, ¾ In. to the Foot.

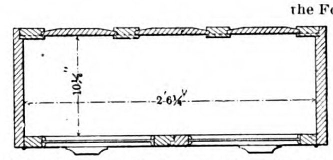


Fig. 50.—Horizontal Cross Section on Line AA of the Elevation.—Scale, ¾ In. to the Foot.

The Jobbing Carpenter and Some of His Work.—VIII.

The bookcase is designed to stand on a side table and of course may be used for other purposes than that mentioned. For example, it would appear to be just the thing for a student of a correspondence school, for in it he could keep the text books belonging to his course and other technical works in the upper portion of the case, while his writing materials could be kept in the drawer at the bottom. If the table supporting the bookcase was equipped with a good sized drawer he could keep in it his drawing board, with drawing materials, and thus have everything conveniently at hand. The drawing board would be used on the table and by pulling out the small drawer and resting the back edge of the drawing board

In Fig. 47 is shown the method used by the writer. The sizes marked are the finished sizes of the pieces, and when cutting them allowance must be made for dressing up. The column headed "Kind of wood" is generally omitted, as in most cases the second column indicates this sufficiently. The numbers in the last column are marked on the pieces with blue or red crayon as they are cut. They are chiefly useful in a job containing a large number of pieces or in connection with a job that may be laid to one side before it has been completed. In a case of this kind the workman might forget for what purpose a certain piece was intended, but a glance at the number on the piece and then at his list would at once tell him.

It does not take a very wise man to see the advantage of a list of this kind, for not only is he able to make a better estimate of the material required, but, being able by the list to cut up all of the material at once, he can select the best portions for the most important positions and can use up the small pieces to better advantage.

In Fig. 48 of the sketches is represented a front ele-

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—Editor *Carpentry and Building.*

vation of the bookcase which we shall consider. Fig. 49 represents a vertical cross section, while Fig. 50 is a horizontal section on the line A A of the elevation. The figures show quite clearly the construction of the article. The side pieces or ends are the full width of the case and extend the full hight with the exception of the top member of the cornice. The bottom of the case is dovetailed into the sides. The shelf immediately over the drawer and the piece forming the top of the case against which the door shuts are gained or dadoed into the sides. The shelf is merely glued in position, while the top should be fastened with screws from the inside, and further strengthened by having small blocks glued in the angle formed between its upper surface and the sides of the bookcase.

The grooves to hold these pieces should not be cut through the full width of the sides, but be stopped back a short distance from the front edge, so that this edge may appear in an unbroken line from the bottom of the case to the molding of the cornice, as indicated in Fig. 48.

of the sides of the bookcase—that is, ⅞ in. The cap or top member of the cornice is merely a piece of square edged material, and it should, of course, be mitered in the same manner as the molding. If thought advisable a thin board may be fitted in the top of the bookcase flush with the upper surface of this cap, thus preventing an accumulation of dust and rubbish and forming, if carefully fitted up, a secret hiding place that might prove useful. There are various styles of shelf supports that may be obtained for the adjustable shelves, but plain wooden pegs answer every requirement and are easier to secure. The holes for these pegs are ⅜ in. in diameter and should be bored about ⅝ in. deep with a perfect cutting bit before the case is put together.

The fixing of the cornice completes the framework of the bookcase, and we will now turn our attention to the doors. As will be seen from an inspection of Fig. 50, these are rabbeted together where they meet in the center, and because of this the center stiles are made ⅜ in. wider than the others. A ⅜-in. bead is worked on the meeting edge of the right hand door, thus breaking up the wide surface that would otherwise be there, and making all the stiles appear of the same width. The stiles and top rails should then be about 2 in. wide, measured with the bead that holds the glass, and the bottom rails ½ in. wider. In the present example the beads are made separate and braded on, thus making stiles and top rails 1¾ in. wide and the bottom rails 2¼ in. These pieces should be cut from the straightest portions of the material and must be dressed perfectly flat and out of wind before any other work is done to them. This is very important, and if not attended to the doors

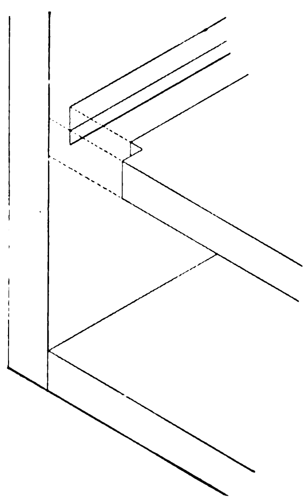


Fig. 51.—Showing the Manner in Which the Shelf Is Fitted.—Scale, 3 In. to the Foot.

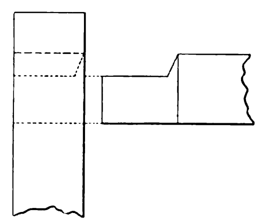


Fig. 52.—Detail of the Mortise and Tenon Joint Used in the Doors.—Scale, 3 In. to the Foot.

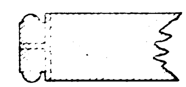


Fig. 53.—Beads for Holding the Glass in the Doors.—Scale, 6 In. to the Foot.

The Jobbing Carpenter and Some of His Work.—VIII.

An idea of the manner in which the shelf is fitted is shown in Fig. 51, while the top being kept back ⅞ in. from the front does not require to be shouldered. The top rail of the case, that immediately above the doors, is shouldered back ½ in., and grooves are cut in the sides of the case to the depth of ⅜ in. for the reception of the small tenons thus formed. A couple of nails may be driven through the sides of the case into this rail, where they will be hidden by the molding of the cornice. Small blocks should also be glued in the angle formed between it and the top of the bookcase, care being taken to have the case perfectly square before any of these blocks are glued in place.

The back of the bookcase may be covered with ⅝-in. matched and beaded sheathing, but in some cases the construction shown is better. In it four uprights or stiles with grooved edges, and long enough to reach from top to bottom of the bookcase, are properly spaced and nailed to the top and bottom boards, after which panels of ½-in. material are fitted in between them and have their centers nailed in the same manner. Note that the stiles are gained over the top and bottom boards and the shelf above the drawer as far as the front edge of the plow groove, thus allowing the panels to come close up and make everything dustproof. The molding for the cornice should be about ¾ x 1 in. or 1 x 1¼ in.—not larger—and it should be obtained at the commencement, as upon it depends the width of the top rail and, incidentally, the exact hight of the bookcase.

The top rail is of such a width that the margin left after the molding is on is the same width as the edges

will be "winding," and it will be impossible to make them fit properly.

In Fig. 52 is shown a detail of the mortise and tenon joint used in the doors. It is not usually considered good cabinet work practice to cut the mortise right through, as shown, but, as the ends of the tenons do not show except when the doors are open and mortises are easier to make this way, also because this is the stronger method of the two, the writer advises its use in the present instance. Do not forget to leave the stiles an inch or two longer than the finished length or you will probably force out the ends of the mortise in the making of them.

The beads for holding the glass are made as follows: In a piece of board the same thickness as that used in the doors and a little longer than the glass measurement work two beads as shown in Fig. 53—one on each side of the board. Mark two gauge lines down the center of the edge of this board about as far apart as the glass is thick. Rip the beads from the board as shown by the dotted lines and plane out the saw marks; then divide the beads by ripping between the gauge lines and plane to the lines. The piece can be planed on the bench the first time, but after the second cutting the easiest way to work it is to fasten the plane, bottom up, in the bench vise, and dress up the beads by drawing them toward you over the plane iron. In fixing the beads put the outside one in first, keeping it just flush with the surface of the door; the inside one can be braded in after the glass is in place and if it is not quite flush it will not matter so much.

If, when fastening these beads, it is found that the heads of the brads split them, drive the brads only part way in and then cut off their heads with a pair of cutting nippers and finish the driving. If the points of the brads split the wood cut them off before entering them, for the cutting makes the brads chisel-pointed and it will be found that they may now be driven into the most brittle material with absolute safety. The foregoing is a scheme that should be found useful to the carpenter in many places.

The hinges are fixed to the doors in line with the edges of the rail, as shown in the front elevation. They should be very carefully fitted. The easiest way to hang the doors is to turn the case on its side and lay the door flat on the bench. In cases where the article cannot be laid on its side the easiest way is to fit the hinges to the case and secure them with one screw; then take them off and apply them to the doors. When it comes to hanging the door the screws can be easily run back into their original holes with one hand, after which there will be no further trouble, as the carpenter will have both hands for placing the remaining screws.

The left hand door is fastened on the inside at the bottom with a small flush bolt. The right hand door is fastened with a flat-keyed brass cupboard lock.

The two shelves for the inside of the bookcase may be made of oak throughout or of pine or basswood faced with oak. In the latter case the best way to glue the oak to the soft wood is to dress up the piece of oak twice the width of the facing it is intended to use and glue one of the pine shelves on each side of it. After the glue is dry rip the oak down the middle and dress up, thus making both shelves with one gluing and with one set of cramps. Only those who have attempted to glue a very narrow and a wide piece of board together will see the full advantage of this method.

In making the drawer for the bottom of the case, the front—which should, if possible, be the best figured piece of wood in the whole article—is made first and carefully fitted to the opening it is to occupy. After this has been done the drawer can be made according to the instructions for making a cash till in the September issue of *Carpentry and Building*. The drawer pulls, if of metal, should be fixed in place and then removed until the article has been filled and polished.

This completes the woodworker's part of our bookcase, and though the writer could give instructions for the filling and polishing, it is quite a job for a novice, and, supposing the maker has no painter friend who will do it for him, he had better take it to a competent man, pay his price and have it finished properly. There is not anything more exasperating than to spend time making a good piece of woodwork and then have it botched up with a coat of gummy varnish, that will only dry after it has been covered with dust and has received the finger prints of every member of the family.

Before closing the subject it will probably be better to point out that the bookcase as here shown will only hold two rows of volumes as large as *Carpentry and Building*, the upper space being left for books of a smaller size. If it is wanted to hold three rows it should be made 4 in. higher and an inch or so wider to keep the proportion about the same.

Objection has been made to keeping books behind glass doors, as this gives the impression that they are more for show than for use. In a room devoted entirely to library or study purposes open shelving is all right, but there are a number of us who do not possess this room, and then, again, we may have little brothers and sisters or little sons and daughters, or perhaps our place of dwelling is a boarding house, in any or all of which cases the books will be all the better for being kept behind glass doors. Even suppose we admit the crime that the books are for show, will some one please tell the writer what looks more ornamental than a row of nicely bound, well kept books?

AN idea of the extent to which suburban property is being improved hereabouts may be gathered from the statement that one contractor has recently filed plans in the Borough of Queens, Greater New York, for 201 two-story brick dwellings, each 20 x 55 ft. in plan, and estimated to cost $4,400, or a total of $906,400. Another contractor is about putting up 32 two-story brick dwellings similar to the above at Ridgewood Heights, and to cost $148,000.

Death of Architect Charles F. McKim.

The members of the architectural profession will learn with deep regret of the death of Charles Follen McKim, president of the American Institute of Architects, 1902-1903, and founder of the well-known firm of architects of McKim, Mead & White of New York City, which occurred on the afternoon of September 14 at his summer cottage in St. James, L. I. He was born in Chester County, Pa., August 24, 1847, and early in his career entered the Lawrence Scientific School of Harvard University and was graduated in 1867. Later he went to Paris, entering the *Ecole des Beaux Arts* as a pupil of Daumet. Here he remained from 1868 to 1870, returning to New York after two years spent in travel and study on the continent of Europe.

It was at this time that he established himself in business as an architect, associating with him in 1877 William R. Mead, and in 1879 Stanford White, under the well-known style McKim, Mead & White.

The work of the firm has been of an exceedingly varied character, creating a veritable renaissance in American architecture, and bringing into prominence the Italian style of design. Among the work undertaken by it may be mentioned many cottages of the wealthy summer residents at Newport, Lenox and other resorts, the buildings of the New York Life Insurance Company in Omaha and Kansas City, the Algonquin club house in Boston, St. Peter's Church in Morristown, N. J., St. Paul's Church in Stockbridge, Mass.; the Freundschaft club house in New York City, the Rhode Island State Capitol at Providence, the Brooklyn Institute of Arts and Sciences, the Walker Art Gallery at Bowdoin College, the Newport Casino, the Boston Music Hall, the Madison Square Garden, the Knickerbocker Trust Company building, New York City, as well as many others. The firm was also responsible for the restoration of the White House at Washington, and recently it was awarded the design for the construction of the mammoth Municipal Office Building on Tryon Row, which will be one of the landmarks of New York City.

Mr. McKim's name is especially associated with the Boston Public Library, the Columbia University Library, the Century and other club houses in New York City; the library of J. Pierpont Morgan, the War College at Washington, and the mammoth Pennsylvania Railroad station, now rapidly approaching completion in New York.

Mr. McKim was a member not only of the American Institute of Architects, but of the Architectural League, the National Academy of Design, the Municipal Art Society, the Metropolitan Museum of Art, the American Fine Arts Society, the Pennsylvania Society, and was an honorary member of the Society of Mural Painters. He was also a member of the University Club and of the Metropolitan Club, the homes of both of which his firm designed; the Lambs' Club, the Brook, the Garden City Golf and the Somerset and St. Botolph clubs of Boston, as well as the Metropolitan of Washington.

In appreciation of his ability as an architect Harvard University in 1890 bestowed upon him the honorary degree of A. M., while four years after Bowdoin College gave him the same laurels. In 1903 King Edward presented him with a gold medal as a token of the appreciation he held for the architect.

ONE of the old historic landmarks known as the Ingram House, on the Brandywine, near what is now West Chester, Pa., and bearing date of 1610, has just been razed to the ground to make room for a modern structure. It is stated that at this house Lord Cornwallis, commanding the British army at the battle of Brandywine, halted his troops on that day and allowed them to refill their canteens with water and take a much needed rest of about an hour.

THE ADVANTAGES OF ROOFING TILE.

THE manufacture of roofing tile in the United States has not advanced as rapidly as the importance of the industry, or its possibilities, would seem to warrant. It is the American idea to improve upon everything European, and yet in the matter of roofing construction we are centuries behind our foreign rivals, says a recent issue of *Brick*. We are usually not satisfied with anything except the best; nevertheless, we continue to cover our buildings with wood, slate, tin, iron or other materials, any of which, at their best, only offer temporary protection and are not commensurate with the character of the buildings themselves.

It must make an American builder somewhat ashamed when on a trip through Germany, for example, to note the general use of clay tiles for roof covering and to learn that many of these roofs have remained undisturbed for centuries, and that they are made to withstand the attacks of time and weather throughout the life of the buildings themselves; and then to reflect upon the thousands of fine structures throughout the United States whose roof coverings are little more than makeshifts, constantly subject to replacement and repair.

A good building is worthy of a good roof, and a good roof must embody utility, durability, beauty and harmony of architectural effect. These merits and many others are combined in tile roofing, which is as superior to slate as slate is superior to shingle. Clay is the oldest form of roofing material known and ranks to-day as the best, most beautiful and most enduring of coverings for the habitation of man.

Clay Tiling vs. Slate for Roofing.

The superiority of clay tiling over slate for roof covering is manifest. There is no question as to its durability, as has been proven by the test of centuries. Clay tiling is absolutely fireproof, whereas it is well known that a slate roofing on a burning building becomes quickly superheated and the draft of a fire causes the slates to break away and fly in every direction, being a menace to all surrounding buildings. Furthermore, clay tiling is a nonconductor of electricity and of heat and cold. There is no record of a building covered with roofing tile having been struck by a lightning bolt.

There are possibilities in the use of roofing tile for architectural effect, in color, warmth and effectiveness, that cannot possibly be produced by slate. In mechanical application roofing tile also possesses many advantages over slate, and on a properly constructed roof should cost less to lay. It is impractical to patch a slate roof satisfactorily; whereas it is an exceedingly easy matter to replace a broken clay tile. Slate roofs rattle in the wind, a fault of which tile roofing could never be accused.

Considering the fact that material suitable for the manufacture of roofing tile can be found in almost every State in the Union, it is somewhat surprising that the industry has not more rapidly developed. If clay workers throughout the country had given the possibilities of roofing tile the consideration that it merits, to-day its manufacture would be so general that its market price would be below that of slate, which in time would cease to be a competitor because of the cost of transportation, usually from distant points. The principal reason for the retarded progress of this industry appears to be the lack of knowledge among the American people as to the beauty, durability and merits of tile roofing. There is a natural disinclination among builders and roofers to undertake new methods in roofing construction. They are inclined to follow the policy of "letting well enough alone," on the theory that if "the man who pays" is satisfied with slate or other roofing, there is no reason why they should encourage him to use something else, no matter how superior that something else might be. Once the American people have awakened to the advantages of tile roofing there will be such a demand for this material that the builders and the clay workers will soon get into line and satisfy that demand.

The clay workers are themselves largely to blame for the slowness of the introduction of tile roofing in this country. They fear to undertake the preliminary experimenting and acquisition of knowledge that will enable them to produce a satisfactory product. They are inclined to wait and let some one else do the experimenting, with the result that the pioneers of the industry are few and scattered. Once they have become convinced of the large profits to be made in this field, roofing tile manufacture will be given an impetus characteristic of American push and progressiveness.

Architects to Blame.

The architects are also somewhat to blame for the slow development of the industry. While one and all acknowledge the superior merits of tile roofing, they have a tendency to recommend it only for more elaborate and costly construction and allow their esthetic ideas to dominate practicality, with the result that their demands for expensive designs in shape and color are such as to require most costly execution of their orders by tile makers and much special machinery and hand labor. Tile making should be more thoroughly standardized, so that roofing tile can have a regular market value, for specific grades and sizes, the same as brick or slate.

In Europe, for centuries, tile has been made by hand. It is largely a local industry and the making of roofing tile is as common an occupation as the making of building brick in this country. There is no reason why, with modern machinery and American ideas, the industry should not become second in importance in this country to the making of brick. Many brick plants, now operating at small profit because of competition, might easily be showing large profits in supplying the increasing demand for roofing tile.

Material suitable for the manufacture of tile roofing is so plentiful in this country and covers such a wide range, that almost any section of the country can produce one or another grade of roofing tile. While clay is the most common material, some of the highest grades in this country are now manufactured from shale with great success. Upon the character of the material depends the process of manufacture. The revolving power press is most often used with success. Speaking in a general way, a clay suitable for roofing tile must be one that will thoroughly vitrify, retain its shape without warping and show a clear, unfading color. A tile sufficiently nonporous to answer all practical purposes and fully equal to the European tile, can be produced in an ordinary brick kiln if proper skill is applied in the burning.

While there will doubtless continue to be more or less demand upon the part of the architects for tile of special designs, yet the profitable roofing tile plant of the future will be one which will adopt standard sizes and shapes and conduct its operations along the lines which make other business enterprises successful, *i. e.*, the largest possible production of standard sizes at the smallest possible cost.

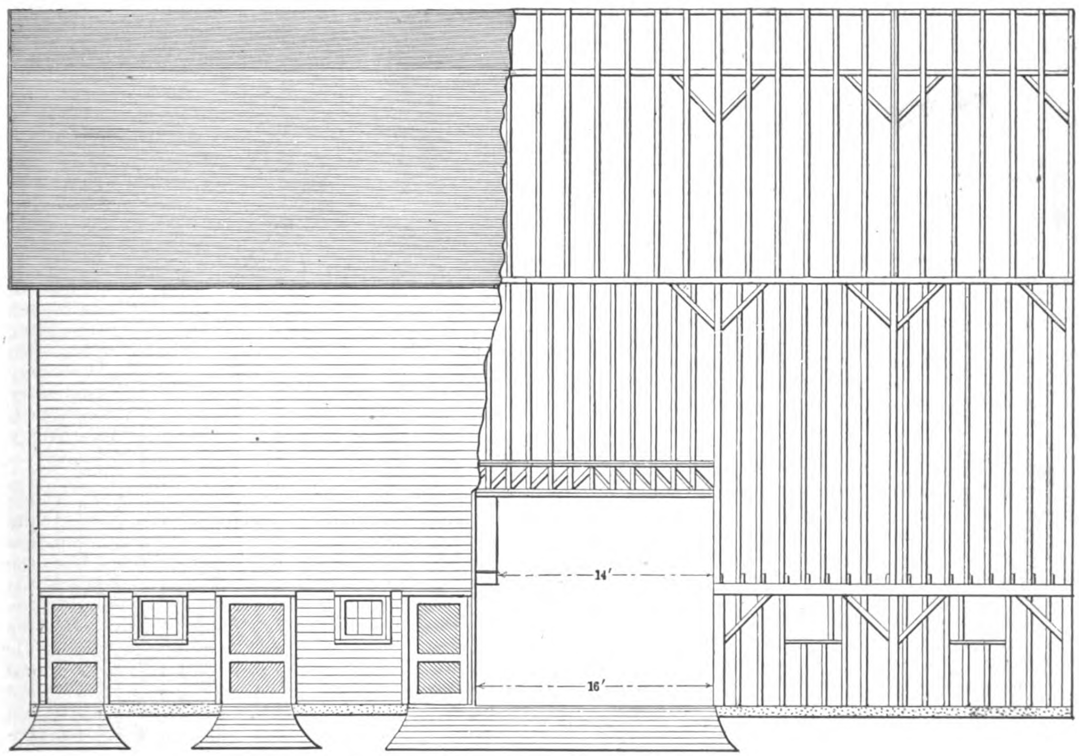
Architect and Builder Work Together

In the future of the roofing tile industry the architect and builder must work hand in hand with the clayworker. It must be understood that the construction of the roof bears an important relation to the use of tile. Roofing tile is suitable for the covering of either brick or frame buildings, it being a simple matter to provide such construction as will be most available for roofing tile and of sufficient strength for its increased weight. It is probable that future construction will provide for double roofing, the tile being laid loosely to provide against expansion and contraction, its principal function being to form a serviceable and lasting protection against the weather.

DESIGN FOR A FARM BARN.

THE drawings of the farm barn from which were made the engravings presented upon this and the following pages were contributed by George W. Wolfe, Morgantown, W. Va., as being of possible interest to some of the many readers of this journal. In regard to the matter he says: This plank frame barn with upground basement—that is, intended to be built on level ground—is constructed in the ordinary manner, and the outside frame is covered with ⅞ x 5½ in. drop siding, while the roof is of slate.

The front and end elevations give an idea of the method of framing employed and also of the finished exterior of the building. The ground plan clearly indicates the position and dimensions of the stables, together with the driveways and feedrooms. What may be regarded as the second floor shows the location of the hay bays, the grain bins, stairs, chutes, &c. The section through the cow stables shows the concrete floor construction and the feed troughs.



Front Elevation.—Scale, 3-32 In. to the Foot.

Design for a Farm Barn.—Contributed by G. W. Wolfe, Morgantown, W. Va.

Reconstruction of the Burned Parker Building

The plans for the reconstruction of what was known as the Parker Building, at Fourth avenue and Nineteenth street, New York City, and partially destroyed by fire last year, have been completed, and the new structure is expected to be ready for occupancy early in the coming year. The new building will be known as the "Pocono," and in hight will be the same as the old building—that is, 12 stories. Its depth along Nineteenth street is 150 ft., and on the Fourth avenue side 82 ft. Some of the floors will be lofts and others will be divided into offices, according to the arrangement made in advance with tenants.

The circumstances surrounding this case make the fireproofing the most important feature of the new building. When the Parker Building was destroyed general surprise was expressed in the city and throughout the country—surprise that a building which had been called "fireproof" should have been so completely "gutted." Experts who examined the ruins, however, soon learned that the fire had been caused by faults which could have been easily avoided. Uninclosed stair and elevator openings and unprotected windows would alone have been responsible for the spread of fire from one story to another and for the destruction of the contents. The column covering was entirely too thin and the lower flanges of the girders were unprotected, except for an inch of plaster.

On account of the wide public interest in the fire last year the precautions to make the reconstructed building safe were sure to be observed with unusual attention. This fact doubtless furnished a particularly strong incentive to the builders and architects to design a really fireproof structure. It may be safely said that no consideration was more important to them than to make the Pocono safe from fire.

Many of those who read of the fire last year will doubtless be surprised to learn that only 26 per cent. of the metal framework was counted as a loss. This is the official figure. The rest remained practically intact and is available for use again, despite the fact that the heat rose to the temperature of from 1700 to 2000 degrees Fahrenheit. Thus the fireproofing, though it was used in insufficient quantity, saved three-fourths of the metal frame for future use. The contents were destroyed not because of the structural material used, but because of the uninclosed vertical openings and unprotected window openings, which allowed the flames to spread rapidly from one floor to another.

For the floors and column covering in the Pocono the architects and builders have selected hollow terra cotta blocks of the kind used in so many of New York's "skyscrapers."

The floors are end construction arches, with side construction skewbacks and key arches. In the 6-ft. spans the terra cotta blocks are 12 in. thick, and in the 4-ft. 6-in. spans 10 in. thick. In the old building they were only 8 in. thick in all spans.

In the old building the cinder fill on top of the floor arches was unusually heavy and thick, and imposed a load which, according to the official report of the New York Board of Fire Underwriters, was entirely too great for the spans. "At the large roof house," the report said, "the dead load alone exceeded the allowable safe live load, the cinder fill at this point being in excess of 30 in."

This fault is remedied in the Pocono by increasing the depth of strength of the arches and at the same time decreasing the load imposed by the fill above. The deeper arches reach nearer to the top of the beams, and hence the cement surface covering is much thinner and lighter than the old cinder fill.

In the Parker Building 3-in. wood sleepers were laid in the cinder fill, and over these sleepers were laid pine flooring. In the Pocono the surface flooring is to be cement.

One of the principal criticisms of the fireproofing of the Parker Building was that lower flanges of the girders were left unprotected. The only covering was an inch of plaster, which, of course, was negligible in a fire. In the Pocono the floor blocks nearest the girders have "lips," which project downward and completely inclose the lower flange, giving it the protection of 2 in. of terra cotta fireproofing. The beam flanges are protected in the same way, the bottom surface of the floor arches reaching down 1½ in. below them.

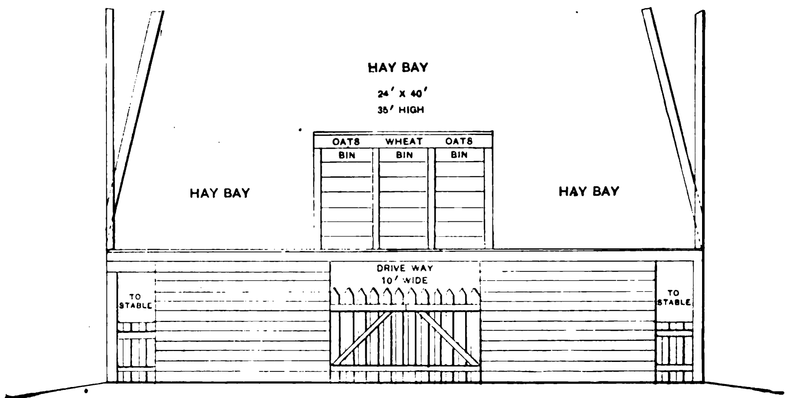
The Fire Underwriters' report on the Parker Building fire criticised very severely the insufficient column covering. The interior columns were protected by only 1 in. of fireproofing; to the inadequacy of this the insurance experts ascribed the collapse of the various parts of the building. In the Pocono the column covering will be 3 in. of hard burned terra cotta, sufficient to insulate the metal from the fiercest heat capable of being generated by the contents of the building.

In the Parker Building the passenger elevators, on the south side, had open grill work at each story. The shaft simply acted as a flue to carry the flames upward. "The unprotected stair and elevator shafts," says the Underwriters' report, "acted as flues, and were the principal cause of the rapid spread of the fire through the building."

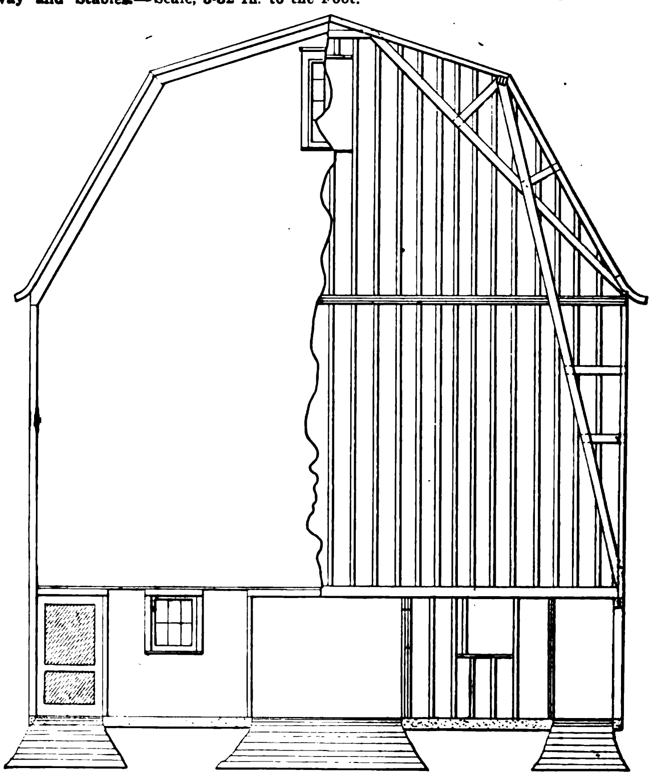
The Pocono is to have its elevator shafts and stairways inclosed by fireproof terra cotta blocks. Each floor is thus to be protected from the one below and the one above in such a way that if a fire starts it will be confined to one floor.

The reconstruction of the Pocono is in charge of the Seaboard Realty Company, 320 Fifth avenue, and the architects are R. H. Robertson & Son, 160 Fifth avenue, New York City.

Adjoining the Pocono on the south will be the new 20-story American Woolen Company Building, both owned and operated by the same company.



View of End, Showing Entrance to Driveway and Stables.—Scale, 3-32 In. to the Foot.



End Elevation, Showing Portion of Framing.—Scale. 3-32 In. to the Foot.

Design for a Farm Barn.

The Infancy of the New York Flat House.

At the time the commonly called "flat" was in its infancy the *Herald*, in June, 1881, published some comments on the subject which is now of more than ordinary interest, and we present them herewith:

Among the changes that have come in the New Yorker's manner of life within the last few years there is none that is more striking than the prevalent fashion of living in "flats." Some years ago there was hardly any option left to the father of a family about hiring a house if he was unwilling to live in a hotel or a boarding house, since housekeeping was only possible on condition of a whole house being occupied.

It is true that "half a house was sometimes to be had by the modest citizen whose desires or whose means stood in the way of his occupying a whole one, but the objections to this plan were manifold and the advantages few. It therefore came about that people who were too well to do to take lodgings in a tenement house, and who disliked boarding, lived in their own hired houses or owned their own domiciles.

The change came from a protest against this system. The demand for half houses was always in excess of the supply and, as in most cases where there is a genuine demand on the part of the public, capitalists addressed themselves to the work of supplying it. Now "half a house," which was the only thing available, except in the tenement house, for the small housekeeper of ten years ago, was not a desirable thing. Primarily the dwelling houses could be built for the accommodation of one family only. There were in the most of them only one kitchen, one bathroom, one hallway, one coal cellar and one parlor. Also the arrangement of chimneys, flues and sleeping rooms made it exceedingly inconvenient, if not impossible in most cases, to divide a house so that one tenant or another should not be deprived of some essential thing unless some rooms were used in common. All the world knows, moreover, that "no house is large enough to contain two families," and there were few places in which peace reigned in a house so divided.

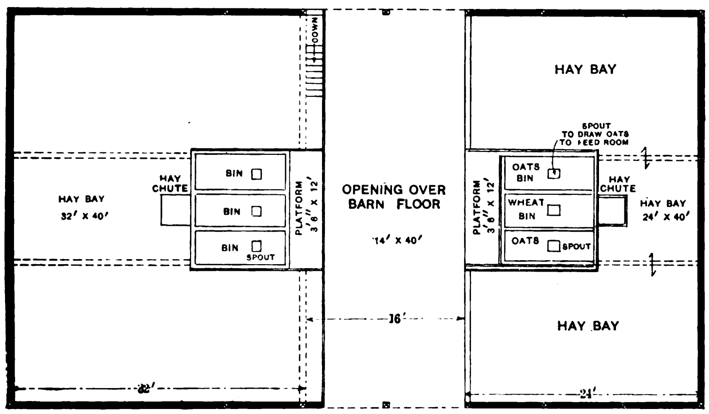
The cry arose for French apartment houses, so called after the French fashion of constructing a building so as to contain separate and complete domiciles for different families.

The idea was not a new one, for tenement houses were numerous in the city, but these had only been built for the poorer classes and the tenements in them were merely suites of three or four or six bare rooms, with no conveniences for housekeeping excepting a hole in a chimney where a stovepipe could be inserted. It came to be believed that if tenement houses could be built for the accommodation of the middle and wealthier classes and if they were called by some other name the people for whom they were built would occupy them.

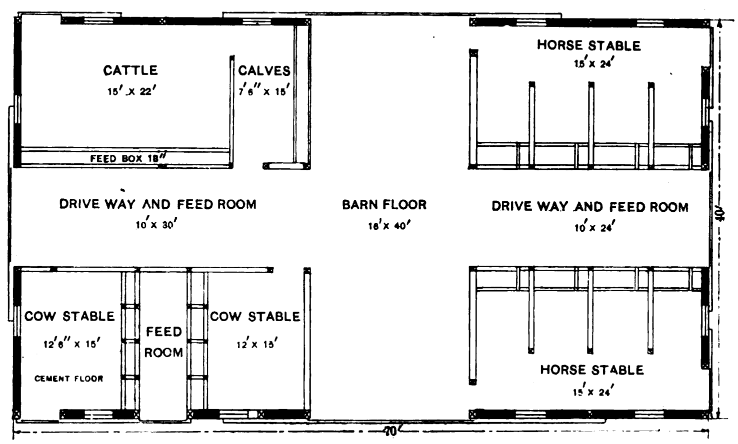
The general public or the tenants understood and appreciated the fact long before few of the capitalists did. Therefore it was that the improved tenement houses were not built for some time after people wanted them, and the first that were built were rented before they were entirely finished.

It is undoubtedly true that there was a prejudice against them at first in the minds of very many people, because they were tenement houses, in law and in fact; but when it came to be understood that they were no more like the poorer class of tenement than a hotel is like a dry goods box the prejudice rapidly wore away.

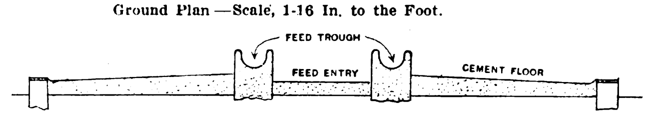
To-day the immense number of "flats," as they are called, which are in course of erection and the readiness with which they are to be rented are sufficient evidence of the popularity of the new idea.



Plan of Hay Bays.



Ground Plan —Scale, 1-16 In. to the Foot.



Section Through Cow Stables.

Design for a Farm Barn.

Concrete Buildings in China.

"The construction of houses and walls of concrete is an industry peculiar to Swatow," says Albert W. Pontius, Consul at that Chinese port, in a recent communication to the State Department at Washington. "The work was instituted several hundred years ago, and the absence of any buildings or walls constructed of brick is conclusive proof of its stability and lasting qualities. The industry originated with a French priest, who constructed one of his chapels of that material.

"Very small pebbles or shale, sand and lime are the ingredients of which the material is made. The mixture, after being thoroughly incorporated, is slightly moistened, and then pounded in a rough wooden mold which is elevated in a runway supported by firmly set poles, and in spite of the crude methods employed, a hight of 60 ft. can be easily reached. When the walls have been constructed, all supports are removed and the concrete is for some days exposed to the air. To this exposure is its characteristic solidity solely attributed. The walls vary from 12 to 16 in. in thickness, and the cost of construction is considerably less than brickwork. The thickness of the walls give absolute guaranty of fireproof qualities. Storehouses and buildings constructed of this material many years ago are conclusive proof of its strength and durability. No single instance has been known of the accidental collapsing of such concrete built walls.

"In some instances split bamboo poles have been used to reinforce the material, the wood preventing cracks from appearing and adding to the strength. Bamboo imbedded in the concrete in this manner does not rot, and it seems odd that the practice is not more general. Steel or iron reinforcing, owing to the added expense, is never used.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DAVID WILLIAMS, - - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - - - VICE-PRESIDENT
RICHARD R. WILLIAMS, - - - - - - TREASURER
GEO. W. COPE, - - - - - - SECRETARY

(Entered at the New York Post-Office as Second-Class Mail Matter.)

OCTOBER, 1909.

Workmen's Compensation for Injuries.

Evidence multiplies to show that laws which hold the employer financially liable for accidents to workmen regardless of where the negligence may lie are working out neither with justice to the employer nor to the moral uplifting of the average employee. Reference has been made to the evils that have developed under the French system of insurance of employees against accident, in which the employer is compelled to pay all premiums and where negligence does not exist as a factor. Under this system it has been found that the progression in the number of accidents is intensified by the constant increase in the average duration of temporary unfitness for work, and consequently in the average compensation due to workmen while they are nonproducers. A similar condition is noted under the British Workmen's Compensation act, especially since the passage of the law of 1906, in which was included a clause, not in the act of 1897, whereby an employer is made liable for an accident caused by serious or willful misconduct, if the result is the death or permanent disablement of a workman. Apart from deliberate attempts to take advantage of this clause, statistics prove that the placing of all responsibility on the employer has had the effect of increasing carelessness on the part of the employee. Care against his own negligence in its relation to himself and his fellow workmen is no longer operative in the same degree that exists under the Employers' Liability acts of the United States and other countries which have not assumed so radical an attitude of paternalism toward the so-called working classes.

American vs. Foreign Laws.

There is, however, a trend of thought in America favoring some law similar to the British and French statutes. In theory, as viewed by those philanthropic persons who advocate them, these laws are wise, in that employers and indirectly the public as a whole stand between the workmen and their families and a poverty which may become pauperism. But it is a grave question whether in practice the system operates to the benefit either of the public or of those whom it is intended to aid. It is not a far cry from the paternalism of the community which provides food and shelter and medical care for the indigent under existing systems and that which compels the employer to pay his working people wages which they do not earn and cannot earn because they were injured through their own negligence. The Employers' Liability acts make the employer financially liable to a workman where the latter is injured through the former's negligence. This law is abused, partly because the sympathy of the average jury is with the injured man seeking to recover from the wealthier individual or corporation who employed him, and partly because of the trickery, even knavery, which exists in certain elements of the legal and medical professions. Under the Employers' Liability act it costs the employer more per individual case decided against him, but the awards of damages are much less frequent than under a system where every accident must be paid for. The system might as well extend to sickness; the principle is the same as in accident cases where the employer is not liable.

The Workings of the Laws.

Sir John Gray Hall, an eminent English lawyer, in a paper read before the Incorporated Law Society of which he is a former president, referred to the opportunity of relatives of workmen to plot for their injury, and this suggests the danger which accident insurance companies have found of some importance in their dealings with policyholders—that of intentional accident. It is easy to imagine a man desperate or stoical enough to submit voluntarily to an accident. Laziness might be the motive, or in the fear of dismissal the opportunity might be seized to put the employer under liability to support a workman until the healing of an injury. There is a semicriminal class of people in this country, intermixed in the cosmopolitan population, which might prove an expensive burden under a system of workmen's compensation or the French system of insurance, which is similar in its principle. There is something non-American in the workings of these laws. The independence of the workman is destroyed to an extent; he has the knowledge that he will be looked after during periods of idleness resulting from his own negligence. If he is injured he receives money for which he gives no return, and to which he could never be entitled were it not for the fact that the law says it must be paid him on the general theory that he must not become a charge to his community. There are plenty of American workmen who would decline to receive money under such conditions, or who, if they were compelled by circumstances to accept it, would consider it as a loan. This is the one extreme class. The other, and perhaps it is the larger, justifies every means by which the employer may be made to pay it money. With such legislation proposed in Congress and by some of the States, it would be well first to examine thoroughly the workings of similar laws abroad.

Chicago's Largest Office Building.

With the rapid increase in the value of ground area and the demands of commercial enterprises resulting from a natural and steady growth of population in the important cities of the country there has in many instances developed a need for more adequate business structures, the rental of which will be more nearly in keeping with the value of the sites involved. In every large city there is a constant tendency to replace older buildings with more modern construction and to build larger and larger as the exigencies of business requirements seem to demand. The latest attempt in outdoing what has thus far been accomplished in the way of a large office building in the city of Chicago is the new structure just planned by the well-known architects D. H. Burnham & Co. for the People's Gas Light & Coke Company, which, including the site of the new building, will involve an estimated outlay of approximately $6,000,000. The struc-

A FRAME BUNGALOW OF ATTRACTIVE EXTERIOR IN THE SUBURBS OF PORTLAND, OREGON

C. B. JOHNSON, Architect

Supplement Carpentry and Building, October, 1909

ture will rise 21 stories above the street level, which, by the way, is the limit of hight in the city, and will occupy a plot having a frontage of 196 ft. on Michigan avenue and 172 ft. in Adams street. Each floor will contain about 10,000 sq. ft. less than an acre, thus embracing in the entire structure something over 13 acres of floor space, providing 1500 offices in which anywhere from 3000 to 5000 people will do business during the working hours of the day. The façades of the building are to be of granite and glazed terra cotta, and up to the top of the fourth story all the granite will be polished. On the main fronts of the building there will be a colonnade consisting of 18 monolithic columns, each 4 ft. 3 in. in diamater and having a hight of 26 ft. 6 in. These are said to be the largest granite columns thus far introduced in Chicago architecture and among the tallest stones ever cut in this country. Each weighs 30 tons, were cut at Cape Ann and polished at Worcester, Mass. The building will be fireproof throughout, and will involve in its construction some rather difficult engineering problems, as it means the sinking of caisson foundations.

A Bungalow at Portland, Oregon.

(*With Supplemental Plate.*)

We have taken for the subject of our half-tone supplemental plate this month an attractive bungalow designed and erected in one of the principal cities of the Pacific Slope, the external treatment of the building being clearly indicated in the picture. It has a basement under the full area with concrete floor and in it are located the laundry trays with hot and cold water connections. The main story is divided into hall, parlor, dining room with built-in buffet and a seat on each side, kitchen, pantry with sink, dripboard, bins and doors below countershelf. There are also two bedrooms with closets. The openings between hall and parlor and hall and dining room are embellished with ornamental columns and in the dining room there is a beamed ceiling with a paneled wainscoting to the plate rail. The bungalow is wired for electric lighting and is piped for gas.

The bathroom is fitted with tub, washbowl and water closet, the plumbing being of the cast enameled variety and first-class in all respects.

The bungalow shown was designed and built at a cost of $1800 by C. B. Johnson, architect, 204 Mohawk Building, Portland, Ore.

New Specifications for Use of Concrete.

It is expected that at the forthcoming convention of the National Association of Cement Users a new set of specifications for the use of cements will be adopted. Among the suggestions and rules are the following:

The materials to be used in concrete should be carefully selected, of uniform quality, and proportioned with a view to securing as nearly as possible a maximum density.

The unit of measure should be the barrel, which should be taken as containing 3.8 cu. ft. Four bags containing 94 lb. of cement each should be considered the equivalent of one barrel. Fine and coarse aggregate should be measured separately as loosely thrown into the measuring receptacle.

If the coarse aggregate contains sand or other fine material, that which passes a sieve with ¼-in. round holes should be considered as sand in measuring proportions. In general, the concrete on the work should contain enough and only enough mortar to cover all particles of stone and fill the voids without an appreciable excess of mortar.

The proportions of cement to sand and stone should be chosen after a very careful study of the local conditions and the available materials. For small and unimportant structures the following list is presented to be used as a rough guide to the selection of proportions for different classes of work. The relative proportions of fine to coarse aggregate may be varied to suit the materials:

(a) A rich mixture for columns and other structural parts subjected to high stresses or requiring exceptional water tightness; proportions, 1:1½:3—that is, one barrel (4 bags) packed Portland cement to 1½ barrels (5.7 cu. ft.) loose sand to 3 barrels (11.4 cu. ft.) loose gravel or broken stone.

(b) A standard mixture for reinforced floors, beams and columns, for arches, for reinforced engine or machine foundations subject to vibrations, for tanks, sewers, conduits and other water tight work: proportions 1:2:4—that is, 1 barrel (4 bags) packed Portland cement to 2 bags (7.6 cu. ft.) loose sand to 4 barrels (15.2 cu. ft.) loose gravel or broken stone.

(c) A medium mixture for ordinary machine foundations, retaining walls, abutments, piers, thin foundation walls, building walls, ordinary floors, sidewalks and sewers with heavy walls: proportions 1:2½:5—that is, 1 barrel (4 bags) packed Portland cement to 2½ barrels (9.5 cu. ft.) loose sand to 5 barrels (19 cu. ft.) loose gravel or broken stone.

(d) A lean mixture for unimportant work in masses, for heavy walls, for large foundations supporting a stationary load, and for backing for stone masonry: proportions 1:3:6—that is, 1 barrel (4 bags) packed Portland cement to 3 barrels (11.4 cu. ft.) loose sand to 6 barrels (22.8 cu. ft.) loose gravel or broken stone.

Reinforced Concrete Tests.

The increasing use of reinforced concrete as a building material has led to numerous investigations of its strength when variously prepared and when subjected to various conditions. Perhaps the most elaborate series of tests is that now being carried on by the United States Geological Survey, which has recently published in Bulletin 344 a preliminary report on the subject. A full report, with a thorough analysis of the results, will be issued after the 52-week tests are completed. The attempt has been made to bring out the comparative value of gravel, granite, limestone and cinders for use in concrete, and the effect of age and consistency on the strength and on the stiffness.

No attempt has been made in this preliminary report, however, to generalize the results of the tests, or to draw any conclusions, however warranted they may appear from an examination of the test data. It is hoped that the matter presented will provoke discussion, and in order to promote this end extended expressions of opinion or attempted applications of theory to results have been avoided. A running commentary on the results of the tests, however, emphasizing matters of particular interest and indicating a few points that might lead to interesting analyses, is included.

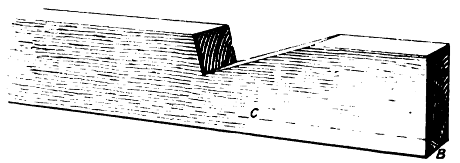
The bulletin, which is by Richard L. Humphrey, may be had free of charge on application to the director, United States Geological Survey, Washington, D. C.

THE PORTLAND SCHOOL OF TRADES, Atkinson Building, Portland, Ore., has issued a new catalogue giving full information as to the courses, admission, expenses and hours. The school is under the direction of the school board, and there are no charges other than those for books, drawing instruments, &c. The school year is the same as that of the public schools, and the shops and classes are in session five days in the week. The school at present offers three years' course as follows: Under building trades, carpentry, cabinet making, architectural drafting, bricklaying, plastering, electric wiring, plumbing and gas fitting; under machine trades, machine work, pattern making, molding and foundry work, electrical construction and mechanical drafting. The shops are fitted with modern equipment and all the work is done under the supervision of practical men. The courses also include mathematics, English, physics and chemistry, and students are required to take the academic work to secure the diploma of the school.

CORRESPONDENCE.

Backing Hip Rafters of Irregular Pitch.

From J. B., Providence, R. I.—One of the kinks or short cuts which I had in mind at the time of my communication, which appeared some time ago, relates to the backing of hips for any polygon or any irregular angle. In Fig. 1 of the accompanying sketches is shown what may be considered the base of a hip; B is the angle of the corner and C is the line of the backing. Set the



Backing Hip Rafters of Irregular Pitch.—Fig. 1.—Base of a Hip Rafter.

bevel to the angle of the polygon and after the hip is cut at the base, then mark the angle of the corner as at B. The diagram shown in Fig. 2 shows the line of bevel for different pitches.

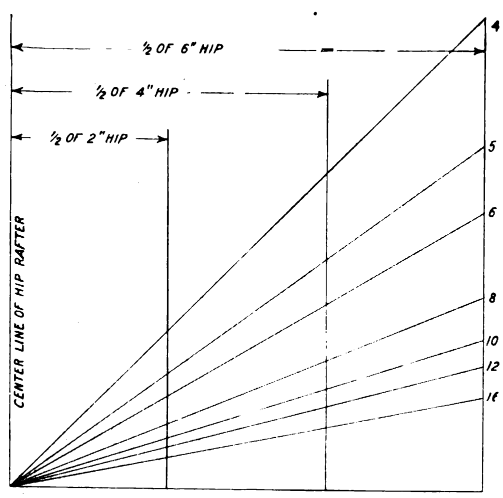


Fig. 2.—Diagram Showing Line of Bevel for Different Pitches.

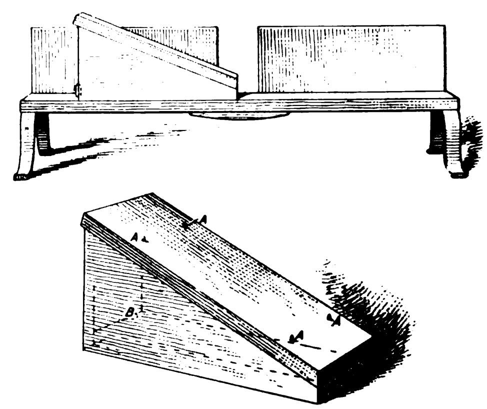
Capacity of Circular Tapering Tanks.

From G. W. G., New York City.—Please inform me how to find the capacity of a circular tapering tank, and also tapering measures for liquids.

Answer.—The solution of the two problems rests on the same principle. Briefly, the capacity of a circular tapering tank is found as follows: Find the square of the diameter of the base; then the square of the diameter of the top; add together these two squares; add to this sum the product of the diameter of the base multiplied by the diameter of the top; then multiply this last sum by the hight of the tank and this product by 0.2618, when the result will give the volume. If the diameters are taken in inches, the volume will be given in cubic inches, and as there are 231 cu. in. in a gallon, if we divide the total number of cubic inches by 231 we get the number of gallons. If the dimensions are given in feet, the volume in feet will, when multiplied by 7.5, give the number of gallons, inasmuch as there are 7½ gal. in 1 cu. ft.

For example, suppose the tank has a circular base whose diameter is 6, a top whose diameter is 4 and a hight between the two bases of 4. The square of the diameter of the base is 36; the square of the diameter of the top is 16; the product of the diameters of the base and top is 24, the sum of these three products is 76. Multiplying this by the hight, or 4, gives 304, and this product multiplied by 0.2618 is 79.59. If the dimensions are in inches the number of gallons would be 79.59 ÷ 231 = 0.344 gal., or 1.37 qt. If the dimensions are in feet the capacity of the tank is 79.59 x 7.5 = 597 gal.

The rule can be used, for example, to find out what hight should be given to a tapering measure to hold a given quantity. For example, suppose that a measure holding 2 gal. is required and as a trial we assume a diameter of the base of 7 in. and of the top of 6 in. The necessary hight can be obtained as follows: The square of the diameter of the bottom is 49; that of the top is 36; the product of the two diameters is 42; the sum of these three products is 127. We may then multiply 127 by 0.2618, which gives 33.25. This is the number which multiplied by the hight of the measure should give 2 gal. As 2 gal. will contain 462 cu. in., the hight of the measure will be equal to 462 ÷ 33.25 = 13.9 (nearly), or roughly, about 14 in. If a measure not so high is desired a larger base diameter or larger top diameter may be chosen.



A Miter Box "Kink."—Contributed by "R. W. M."

A Miter Box "Kink."

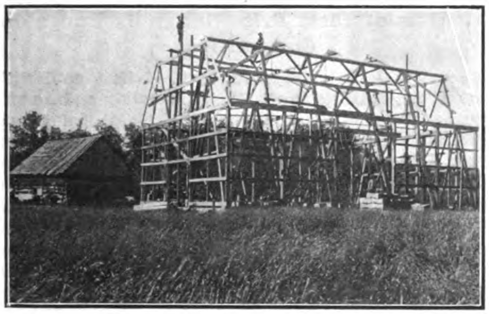
From R. W. M., Uniontown, Pa.—A "kink" which may be of interest to the readers is shown herewith. The saw in my miter box is only 4 in. under back, and recently I found it necessary to make a number of octagon miter in boards 6 in. wide. Accordingly, I constructed a rest as shown in the lower picture, cutting the sides in the miter box at the octagon cut. The points A, A, A, A are brads driven up through the top board and filed snarp. All the standard miter boxes are provided with slides for holding moldings, cutting duplicate lengths, &c., and the opening B is arranged to fit against one of these to prevent slipping. To cut an octagon miter with this device it is simply placed in the box as indicated in the upper picture and the board to be cut laid on top of it, the brads keeping it in place. The saw is then set for a right angle or square cut. I find that with this little device I can cut as accurate miters as I can in the box itself and can cut them in any required width of board.

Conical Roof for Concrete Reservoir.

From P. T. L., Philadelphia, Pa.—In regard to my reply in the June issue to the inquiry of "J. B.," Rockland, Mich., concerning a plan of a conical roof for a concrete reservoir 60 ft. in diameter, 8 ft. deep, with 12-in. concrete floor and 24-in. walls, I would say that, while I consider 4 x 4 in. yellow pine sufficiently strong for the upper members of the trusses that have the roofing boards nailed to them, I think it would be better perhaps if the correspondent make them 2 in. deeper, thereby using 4 x 6 in. members instead of 4 x 4 in.

First Plank Frame Barn in Arcadia, Mich.

From W. H. M., Arcadia, Mich.—I am sending two pictures of a plank frame barn and showing where I am earning my dollars nowadays. I have been shingling three days and feel a little old in consequence. The barn is the first one of its kind put up in this section and it seems to satisfy the farmers pretty well, so that I think others will get in line. The July issue of *Carpentry and Building* helped me out considerably on this barn frame, the article to which I refer being that descriptive of the



First Plank Frame Barn in Arcadia, Mich.—Fig. 1.—Side View of Frame Before Rafters Were in Place.—Cabin of Pioneer Built in 1868 Shown at the Left.

plank frame barn at Bangor, Maine, and concerning which many interesting facts and figures were given.

The first of the two pictures sent you represents a side view of the barn frame before the rafters were in place. The cabin immediately at the left is that of a pioneer, who built it in 1868. The second picture represents an end view of the barn frame, with concrete basement wall.

I omitted to say that the barn is 44 x 60 ft. in size, with 18-ft. posts and 32-ft. purlins.

Comments on Cost of Silo Construction.

From L. H. Hand, Chicago, Ill.—Referring to the description of the two concrete silos, which appeared in the June issue of the paper and which was taken from a recent number of Hoard's *Dairyman*, I would suggest that some of the statements contained therein are somewhat misleading. It will be noticed that in the 16-ft. silo (inside measurement) there are 8 ft. of 8-in. wall, which would equal a straight 8-in. wall, approximately, 52 ft. 4 in. long, which would have a surface measurement of approximately 418 2-3 ft. Such a wall 8 in. thick will require approximately 279 1-9 cu. ft. of filling, or about 10 1-3 yd. Above the ground there is a 6-in. wall 32 ft. high, which would equal a straight wall 49½ ft. long and 32 ft. high, giving a surface measurement of 1584 ft., which would require 792 cu. ft., or 29 1-3 yd. of filling, making a total of 39 2-3 yd.

In the bill of materials only 23 yd. of sand is allowed, leaving a vacancy to be filled of 16 2-3 yd. The estimate gives 54 barrels of cement to 23 cu. yd. of sand, which, according to the best information I can obtain, would be exactly 9 yd., allowing 4½ cu. ft. to the barrel.

Now, if this cement added its full capacity to the aggregate we would still lack 6 2-3 yd. of material for filling the wall, but, as a matter of fact, it adds next to nothing to the volume of the aggregate. For all ordinary work, foundations, &c., it is pretty safe to say that a yard of gravel, a barrel of cement and a barrel of water will make *very nearly* a yard of concrete if it is not hammered down too solid or run in too thin.

The item of wire ropes is put at "20 lb. of wire, $2." Thirteen ropes 50 ft. long would require 650 ft., or about 39½ rods. A rod of ordinary barbed wire, which is two strands of No. 12, weighs 1¼ lb., and a four-strand rope, as stated in the description, would weigh 2½ lb. to the rod. So we must suppose that these ropes would weigh about 98¾ lb. instead of 20 lb., as given in the estimate.

Then the item of "casing" is very lightly passed over by saying that "the lumber for staging and inside forms was used for other purposes." Now, just for fun, ask any practical builder what value he will place on a lot of studding and ½-in. boards that have been nailed and spiked, pried loose and nailed again, bent and twisted, and the entire lot coated with cement? If you can get a bid of anything from any man who works lumber or hires men to work it I will agree I am wrong.

There is little chance to figure the first silo as no thickness of wall is given, but the last item in the estimate is, to say the least, startling:

"Roof and door frames and doors, $9.70."

All I ask is for any one to go to a lumber yard and see what part of the material he can buy for a circular roof for a 10-ft. building for $9.70, or whether he can buy even the doors and frames for $9.70.

It is very discouraging for a person who is not posted and consults a standard journal for information to find that what he obtains is misleading. For instance, silo No. 1 is called a "one man silo," and it is stated that one man built it in 41 days. I very recently dug a 10-ft. hole 15 ft. deep in my barnyard for a cistern. I had two men besides myself, a horse and a boy to drive. It would foot up nearly 41 days for one man, and I tell you the dirt that comes out of a hole of that size is a sight. I am certain I would not run after the contract for either of these silos at double the estimate given.

Note.—With a view to throwing as much light as possible upon the details of construction in connection with the 16-ft. silo above referred to, the comments of our correspondent were submitted to C. J. W. Jones, Roanoke, Mo., who, we understood, contributed much of the data on which the article in Hoard's *Dairyman* was based. Mr. Jones says:

"I am glad to answer the criticism of your Chicago correspondent, as it will tend to straighten out some of the points involved. The article published in Hoard's *Dairyman* and reprinted in *Carpentry and Building* for June of the present year, describing a concrete silo 16 ft. by 40 ft., is an abridgement of an account which I wrote for the first named paper a few years ago, and which it has wholly or partially reproduced several times. I receive so many calls for the article in its

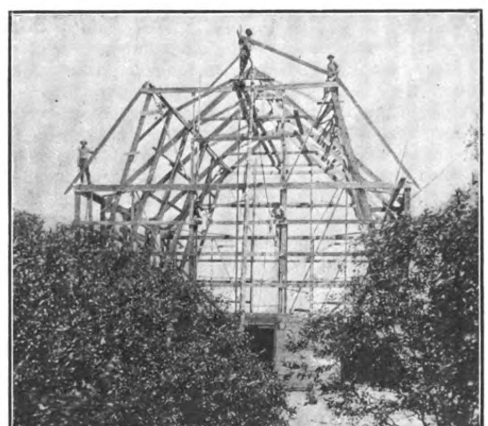


Fig. 2.—End View of Frame Showing Concrete Basement Wall.

original form, even at the present day, that I have had reprints made of it and inclose one with this for the perusal of the editor.* My attention has been called to the criticisms of the article as it appeared in *Carpentry and Building* as being in many respects misleading.

"Objection is made that 54 barrels of cement and 23 cu. yd. of sand would not build almost 40 cu. yd. of wall. True, but it would fill the voids in almost 40 yd. of broken limestone which were tamped into the wall,

* As soon as we can secure a cut of the silo in question we will publish Mr. Jones' original description of it in these columns.—EDITOR *Carpentry and Building.*

and this was explicitly stated in the article as it first appeared in Hoard's *Dairyman*. In giving items of expenditure I only furnished those for which I directly paid out money. The stone was broken on the farm.

"Objection is further made that 20 lb. of wire would not be enough to make 13 wire ropes, each 50 ft. long. I said nothing of the kind. I stated there was a four-strand wire rope for every 1½ ft. of wall, which would be just twice 13 ropes. I did not in my account of the matter say '20 lb.' of wire, but 200 lb. If my critic had read the article carefully and reflected a little he would have concluded that the 20 was a misprint. If $2 seems a small price for 200 lb. of wire I will explain by stating it was bought at a bargain sale.

"Some ridicule and even a little fun is attempted at my statement that the lumber used for inside forms and staging was used for other purposes. After describing how bad the lumber would be after having been nailed and renailed, pried off and twisted, the critic declares if I could get a bid of anything for it from a practical builder he would confess he was wrong.

"Now, the simple statement of the writer was that he had used this material for other purposes. Nothing was said about it being sold to a 'practical builder.' Not even an estimate was placed on it for home consumption, but I will now state that nearly first value was realized out of this lumber in other structures about the farm. I hope my Chicago critic will see he was 'wrong.'

"In conclusion, I wish to say this silo was built four years ago and stands as perfect as when erected, and I can see no reason why it should not endure for ages. Lightning struck it shortly after it was erected, but no damage was done to it except the shattering of the door frames. I am of the opinion that a wooden silo would have been ruined.

"It may interest the readers of *Carpentry and Building* to know that since building the silo I have constructed a cistern 14 x 20 ft. in the same manner as the silo and arched it over. I have floored my dairy barn and built a milk house 10 by 26 ft., both of which are roofed and floored with concrete. The milk house is both wind and fireproof."

Design and Construction of a Rowboat.

From H. K. M., Dartmouth, N. S.—I am thinking of building a pleasure rowboat—one pointed at both bow and stern—but I have no plan to follow, and, therefore, come to the Correspondence columns of *Carpentry and Building* in the hope that there may be some among the many readers of the paper who are in a position to afford me the necessary information. I would like to see published the drawings of the various parts, together with dimensions and particulars of construction. This information will not only be of value to me, but, I am sure, it will be acceptable to a great many others who would like to build boats for themselves, but do not know how to proceed.

Water Power for Carpenters' Shops.

From A. H. D., Walpole, Mass.—I have been reading the article on "Water Power for Carpenter Shops," by Paul T. Lesher, published in the August issue of the paper, and I should like to ask for a little more information through the medium of the Correspondence columns. I desire to obtain about 5 or 6 hp., and wish to know how large a stream will have to be applied in order to accomplish this, provided I use a 3-ft. wheel. Would it be advisable to use a smaller wheel?

The water in this locality has a pressure of 80 lb. per square inch. Will it be necessary to have a larger head of waterback of the size stream applied? I mean by that, directly back of the stream applied, and can I run the same size pipe clear to the main?

Note.—The letter of our correspondent above was submitted to Mr. Lesher, who replies as follows: "The correspondent does not state his conditions very clearly as regards the distance the water wheel will be situated from the water supply; also the distance this supply is situated below the water wheel base. These are factors which are very important in hydraulic calculations.

"In regard to the questions raised, I would say that I have assumed the water main to be situated 8 ft. below the water wheel base and that the length of the pipe connecting the water main with the water wheel nozzle to be 50 ft. With these assumptions the connecting pipe should be 4 in. inside diameter to develop 6 to 10 hp., using an 18 in. diameter No. 4 Pelton water wheel, running 680 rev. per min.

Criticism of First Prize Design in Bungalow Competition.

From S. F. T., Maywood, N. J.—I have read with interest the criticism in the May, June, July and August issues of *Carpentry and Building* on the design that won the first prize in the bungalow contest. Like the other critics I think the design, particularly the ground plan, is very good, but the construction, in my estimation, is very faulty and weak, and I would like to have Mr. Fidler explain some of the following points through the columns of the paper:

In the first place, it seems to me the roof is entirely too flat to shed the snow loads which they have in and around Jamestown, N. Y. It would not be so bad if the rafters were heavier and spaced closer together, but with rafters only 2 x 4 in. and spaced 32 in. on centers on a stretch approximately 18 ft. long, I fail to see what will prevent the roof from sagging or leaking.

The 2 x 6 in. floor joists also are to my mind too light. In the living and bedrooms, &c., where there are piers and girders underneath this is not so bad, but in the dining room and kitchen—rooms that are most used—what will prevent the floor from sagging badly when only a 2 x 6 in. joist is used on a span 14 ft. long in the clear?

There are no laundry tubs in the kitchen or cellar, but this is rather a fault of omission than commission.

Answer.—In answer to the questions raised by our correspondent above, Mr. Fidler, the author of the first prize design in the bungalow competition, says the roof is of the flat variety, but has the appearance of being flatter than it really is on account of the building being considerably wider across the front than it is deep from front to rear. I agree with the correspondent that for any and all sections of the country rafters 2 x 6 in. spaced 24 in. on centers would be better construction.

As to the 2 x 6 in. floor joists not being heavy enough I confess that I do not agree with the critic. It will be noticed that the joist are to be bridged at least every 6 ft., which means that in a 14-ft. span there would be bridging every 4 ft. 8 in., which would tend to bind all the joist into one solid frame. This, however, is a matter of opinion, and each has a right to his own.

The laundry tubs were left out of the building, not because they would not be a great convenience, but because I felt at the time of designing the bungalow the laundry tubs were an added expense as well as a luxury in a $2300 house. These, however, could be installed at any time after building.

Strength of Ropes, Blocks, Etc,

From C. J. M., St. Johns, Newfoundland.—I notice in the Correspondence columns of the September issue a letter from "W. S.," Paterson, N. J., in which he asks for information with regard to the strength of ropes, blocks, &c. In reply to his request I present the following, taken from Harmsworth's Self-Educator:

Pulleys.—The pulley is a wheel whose circumference is grooved to prevent the rope—called the tackle—which passes around it, from slipping off. The wheel turns freely on an axis through its center and is fixed in a framework called the pulley block or sheave. Sometimes this pulley block is fixed to a beam or rafter. Sometimes it is movable, as on a crane, and sometimes series of pulleys are arranged in a particular combination.

The fixed pulley, Fig. 63 (Fig. 1 of the accompanying illustrations), gives no mechanical advantage, the weight on one string requiring to be balanced by an equal weight on the other. It is useful, however, in changing the direction of a force, so that by pulling down or horizontally a weight may be raised vertically.

Movable Pulleys.—The single movable pulley is shown in Fig. 64 (Fig. 2), the weight W being supported by two cords. The tension in each is evidently $\frac{1}{2}$ W, but as one cord is attached at A to the beam, the force or weight P has only to support $\frac{1}{2}$ W or $\frac{W}{2}$. Thus:

$$P = \frac{2}{W}\text{: that is } \frac{W}{P} = 2.$$

or the mechanical advantage in a single movable pulley = 2. In other words, the weight is twice the power—1 lb. being able to support 2 lb. To obtain this advantage, however, the strings must be parallel.

A still greater advantage is gained when several movable pulleys are combined to raise a weight. The three methods of combining pulleys are spoken of as the first, second and third systems.

Separate String System.—In the first or separate string system, Fig. 65 (Fig. 3), each pulley hangs by a separate cord. One end is fastened to a beam or other support, and after passing round a pulley the cord is attached to the block of the one above it. The last cord, however, passes over a fixed pulley and supports the counterpoise P, the weight W being attached to the lowest pulley.

It is necessary to suppose in all theoretical questions concerning pulleys that the ropes or cords are perfectly flexible and that friction is absent. Then it follows that the tension of the rope is the same in every part, irrespective of the number of pulleys in the combination. As a matter of fact, however, these two theoretical conditions are very far from being present in practical work, and though in theory the greater the number of pulleys in any system the greater would be the mechanical advantage, the enormous amount of friction and the lack of flexibility of the cord render a multiplication of pulleys impossible.

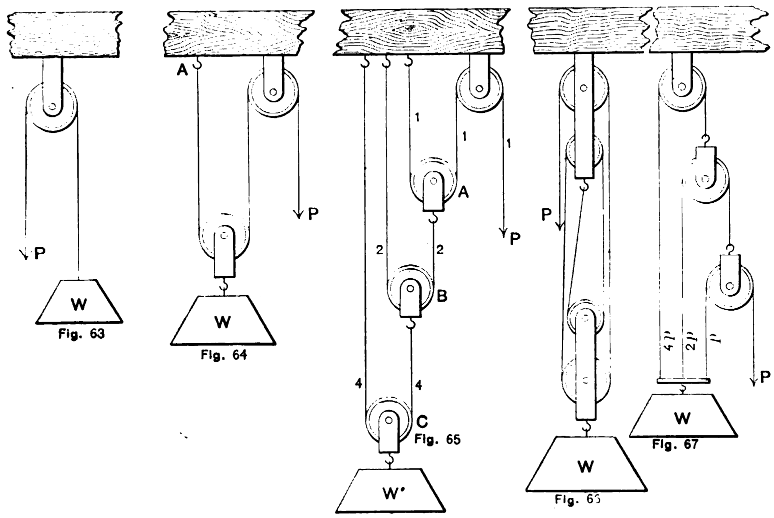
In Fig. 65 (Fig. 3) it is clear that the tensions on the strings marked 1 are equal, as in the case of the single movable pulley, so that P supports a weight equal to 2P on the first pulley block A; hence, the tension on the strings below A equals 2P, and so the pulley B supports a weight 4P (2^2P). In the same way C supports a weight 8P (2^3P) and so on, each successive pulley doubling the mechanical advantage.

With three pulleys, therefore, W = 2^3P; with four pulleys W = 2^4P; with any number of pulleys conveniently represented by the letter n

$$W = 2^nP\text{; that is, } \frac{W}{P} = 2^n.$$

Thus the mechanical advantage in the first system = 2^n.

Single String System.—In the second or single string system Fig. 66 (Fig. 4), the pulleys are contained in two blocks—the upper one fixed, the lower one movable, the weight being attached to the latter. The same string passes around all the pulleys, as shown in the diagram. Here the tension throughout the string = P, and as there are four (practically) vertical strings supporting the lower block the weight W is suported by four upward forces, each equal to P, therefore W = 4P; if there are *n* pulleys then W = *n*P; that is, $\frac{W}{P} = n$; thus the mechanical advantage in the second system = *n*.



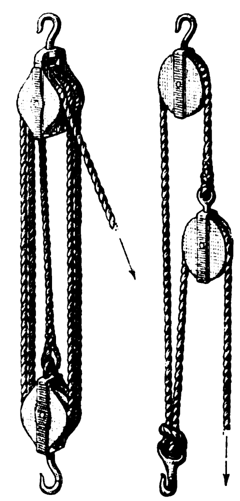


Fig. 1 (Fig. 63).—The Fixed Pulley.
Fig. 2 (Fig. 64).—The Single Movable Pulley.
Fig. 3 (Fig. 65).—The Separate String System.
Fig. 4 (Fig. 66).—The Single String System.
Fig. 5 (Fig. 67).—What Is Known as the Third System.

Fig. 6.—Triple and Double Block Purchase.

Fig. 7.—A Purchase Composed of Two Single Blocks.

Strength of Ropes, Blocks, &c.—Contributed by "C. J. M.," St. Johns, Newfoundland.

Third System.—The third system is really the first system turned upside down, as in Fig. 67 (Fig. 5), the end of each string being attached to a bar carrying the weight. The tensions supporting the weight here are:

$$P + 2P + 4P$$

Thus W = 7P or W = (2^3P — 1) P.

The index of the figure 2 will be the number of pulleys.

With four pulleys

$$W = (2^4 P - 1) P = (16 - 1) P = 15P.$$

With *n* pulleys

$$W = (2^n - 1) P\text{; that is, } \frac{W}{P} = 2^n - 1.$$

Thus, the mechanical advantage in the third system equals $2^n - 1$.

It must be noted, however, that in this system the weight of the pilleys assists the power instead of acting against it, as in the other two systems.

In Fig. 6 is shown a set of pulley blocks in which the combinations, Figs. 3, 4 and 5, are embodied in a practical manner by putting the sets of pulleys side by side on the same axis. Any hight of lift may be obtained by these by giving enough length of rope.

In Fig. 7 is shown a purchase composed of two single blocks, commonly called a burtin. It is easily rigged and very handy for hoisting short distances.

In regard to the strength of ropes, Kidder's "Architects' and Builders' Pocket Book" has the following: To compute the strain that can be borne with safety by new ropes, hawsers and cables, deduced from the experiments of the Russian Government upon the relative strength of different circumferences of ropes, hawsers, &c.

The United States Navy test is 4200 lb. for a white rope of three strands of best Riga hemp of 1¾-in. circumference—that is, 17,000 lb. per square inch—but in the following table 14,000 lb. is taken as the unit of strain that can be borne with safety.

Rule.—Square the circumference of the rope, hawser, &c., and multiply it by the following units for ordinary ropes, &c.:

Table Showing the Units for Computing the Safe Strain that May Be Borne by Ropes, Hawsers and Cables.

Description.	Ropes.				Hawsers.		Cables.	
	White.		Tarred.		Wh.,	Tr'd,	Wh.,	Tr'd.
Circumference, in inches.	3 str. Lb.	4 str. Lb.	3 str. Lb.	4 str. Lb.	3 str. Lb.	3 str. Lb.	3 str. Lb.	3 str. Lb.
White rope:								
2.5 to 6 in....	1,140	1,330	..	...	600	...	...	...
6 to 8 in.....	1,090	1,260	...	...	570	...	510	...
8 to 12 in.....	1,045	880	...	...	530	...	530	...
12 to 18 in....	...	...	...	...	550	...	550	..
18 to 26 in....	.	...	...	...	...	...	560	...
Tarred rope:								
2.5 to 5 in....	...	...	855	1,005	...	460	...	...
5 to 8 in......	...	...	825	940	...	480	...	...
8 to 12 in.....	...	...	780	820	...	505	...	505
12 to 18 in....	...	...	...	...	...	...	...	525
18 to 26 in....	...	...	...	...	...	...	...	550
Manila rope:								
2.5 to 6 in....	810	950	...	...	440	...	...	...
6 to 12 in.....	760	835	...	...	465	...	510	...
12 to 18 in....	...	...	...	...	...	...	535	...
18 to 26 in....	...	...	...	...	...	...	560	...

When it is required to ascertain the weight that may be borne by ropes, &c., in general use, the above units should be reduced one-third in order to meet the reduction of their strength by chafing and exposure to the weather.

CONVENTION OF MASTER SHEET METAL WORKERS.

THE fifth annual convention of the National Association of Master Sheet Metal Workers, held at the Galt House, Louisville, Ky., on August 11, 12 and 13, was a most successful gathering, not only by reason of the admirably planned programme for business and pleasure, but for the results achieved in a practical way. The meeting was opened by President Edwin L. Seabrook, and an official welcome to the city was extended by the Mayor of Louisville, to which the president briefly replied.

Reports of the secretary and treasurer were presented showing the association to be in a flourishing condition, both as regards membership and finances. There are now 1015 names enrolled on the list, which is a net increase over last year of 43.

The president presented his annual report, showing that the association had closed a most successful year, and that since the last convention the work of organization of local associations has gone steadily forward. Eleven have been organized and affiliated with the National Association during the past year, these including New Orleans, La.; Nashville, Tenn.; Youngstown, Columbus, Springfield and Mansfield, Ohio; Wheeling, W. Va.; Savannah, Ga.; Little Rock, Ark.; Salt Lake City, Utah, and Evansville, Ind.

The president referred at some length to the matter of "Trade Protection," which is the important feature of the work of the association, pointing out that great advancement has been made in this direction. He further stated that if he could "strike a keynote for this convention it would be association extension. I wish," he said, "we could ring this out as a clarion call to every honorable sheet metal contractor. I wish we could not only catch the ears of these, but could get them into action for the principles and policies of our association—association extension, open shop, unrestricted apprenticeship, better material, better prices, trade protection, undue competition eliminated and everything else it implies, carried into every nook and corner of this great American commonwealth. As a convention you have before you a great opportunity, greater than any in this trade that has preceded you; probably greater than any that may succeed you for some time to come. Will you take hold of the opportunity and deliberate and wisely plan to carry our association into every part of this great country and to every master sheet metal contractor in it."

Secretary Otto Goebel presented a report for the Board of Directors, which, among other things, approved of the recommendation of the president to reduce the entrance fee for individual members, and later an amendment to the by-laws to this effect was adopted.

Robert Kain presented the report of the Committee on Legislation setting forth the difficulties in formulating and securing regulations, and recommended that each local association appoint a member to work in conjunction with the committee.

The session of the evening of August 11 was opened by President Seabrook introducing Philip Schafer of the Follansbee Bros. Company, who gave a lecture on the processes of manufacture of hammered open hearth tin plates. This was followed by a demonstration of the acid test applied to the Toncan metal made by the Stark Rolling Mill Company, after which H. N. Taylor showed by means of stereopticon some 40 pictures of tin roofs that had stood for a half century and over, meanwhile calling attention to their excellent fire resisting qualities.

The morning of Thursday, the 12th, was devoted to an executive session, and on Friday morning open session of the convention was resumed. It was voted to defer until the next convention action on the proposed amendment to the by-laws to change the time of holding the annual convention to the second Wednesday in February.

The Local Secretaries Club presented a report recommending that a committee be appointed to provide for uniform local by-laws, and that local secretaries send copies of their minutes to the national secretary for the general good of the association.

The Committee on Resolutions presented a report extending a vote of thanks to the Galt House for courtesies extended, to the manufacturers and jobbers for making exhibits and for other courtesies, to the Louisville Association for its courtesies and to the trade press in advancing the interests of the association.

A resolution was also adopted suggesting that the American Institute of Architects hereafter specify composition roofing, including all flashing, counter flashing, valleys and gravel stop necessary to complete the roof, separately from the rest of the sheet metal work, such as cornice, skylight, &c., thereby making but one party responsible for the composition roof.

The election of officers resulted in the following choice:

President, Edwin L. Seabrook, Philadelphia.
First Vice-President, S. Spiro, Birmingham, Ala.
Second Vice-President, John Bogenberger, Milwaukee.
Third Vice-President, Frank P. Smith, Norfolk.
Fourth Vice-President, Frank J. Hoersting, Dayton.
Secretary, Otto Goebel, Syracuse.
Treasurer, W. A. Fingles, Baltimore.

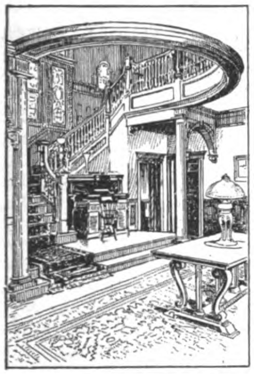
The president appointed the following Committee on By-laws: G. E. Snyder, Columbus; E. G. Heartick, Louisville; E. J. Beseman, Hartford; H. D. Dickson, Peoria, Ill., and J. P. Williams, Omaha.

Philadelphia was selected as the place for the next convention by a vote of 30 to 27 for New Orleans.

SOME PROBLEMS IN STAIRBUILDING.—X.

BY MORRIS WILLIAMS.

OUR next subject for consideration is a stairway starting with a large curve of 32 in. radius, the curve containing eight risers, as shown from the newel at A to the springing line at C of Fig. 65, which represents a plan of the cylinder stairway. Between risers 6 and 7 is a platform, while a second one is shown between risers 17 and 18, the risers in both curves being placed at equal distances apart. At the top of the upper flight a goose neck curve will be formed to connect with the landing newel, as indicated in Fig. 71. It is the intention of the writer to show at this time how to construct the rail from the newel on the first floor to the newel on the second floor.



We show in Fig. 66 how to lay out the face mold for the wreath over and above the curve at the bottom from the newel on the first floor to the hight of the eight risers contained in the curve. The first process is to draw the elevation of these risers, as indicated from *c* to *c'*, in Fig. 66. From the point *c'* draw a few of the straight steps with the pitch board, as indicated by the shaded portions above the point *c'*. Prolong the pitch of these steps to *b'*, or anywhere it is desired to have the hight of the wreath, at the end *a* connecting to the newel.

From *b'* draw the short line *b' b*, and from this last point draw a line to *a*. This last line will be the bottom level tangent, and because it is drawn from *b'* and level, it follows that it will be the same hight all along from *b* to *a*, which is, as shown, a trifle higher than the third riser. This means that the wreath according to this arrangement will be the hight shown from *b* to *b'*, higher above the nosing at the newel than at the end *c'*, where it is shown to be upon the nosing of the ninth step.

If it is desired that the wreath follow the nosing line of the steps all around the curve from *c* to *a*, then the pitch line *c' b'* must be continued beyond the point *b'*, as shown to d and the level tangent drawn from *d* to *a*, as indicated by the dotted line *d a*. By this process the hight of the wreath at the newel *a* may be determined at will.

To lay out the face mold the bottom level tangent *b a* must be transferred to it, as shown from *b'* to *a'*, and it is accomplished by drawing a plumb line from *a* at the newel to *w*, and from *w* to the point indicated. A line is drawn square to the pitch board tangent *c b*, as shown from *w* to *m* and *a'* Now revolve the point *a* of the plan to 3', as indicated by the dotted arc 2. Draw a plumb line from 3' to 4 and revolve 4 to *a'*, as shown by the dotted arc 5. Now connect *a'* with *b'*, which will be the level tangent transferred to the face mold. The angle at *b'* between this line and the pitched tangent *b' c'* will tbe the one required between the tangents of th face mold to square the joints at each end.

To find the major and minor axes draw a line from the plan center O parallel to the plan level tangent *a b*, as shown by the dotted line O *z*. This line will be the plan of the minor axis. Now draw from *z* the plumb line *z z'*, and draw *z' o'* parallel to the level tangent *b' a'* of the face mold. Make *z' o'* equal in length to *z* O of the plan. The line *z' o'* will be the minor axis, and by drawing a line from *o'* to *a'* will give the major axis.

Upon the minor axis mark the points 1, 2, 3 at the same distance from *o'* as the same figures are shown to be from the plan center O across the plan rail. To find the points upon the major axis to which to fix the pins, place the length *o' s* of the major axis in the dividers, and with 3 on the minor axis as center draw the arc cutting the major axis in the points 2 and 2, which will be the location for the pins to strike the inside curve of the mold, as shown from *n* to *s*. Again place in the dividers the length of *o' g* on the major axis, and with 1 on the minor axis as center strike the arc cutting the

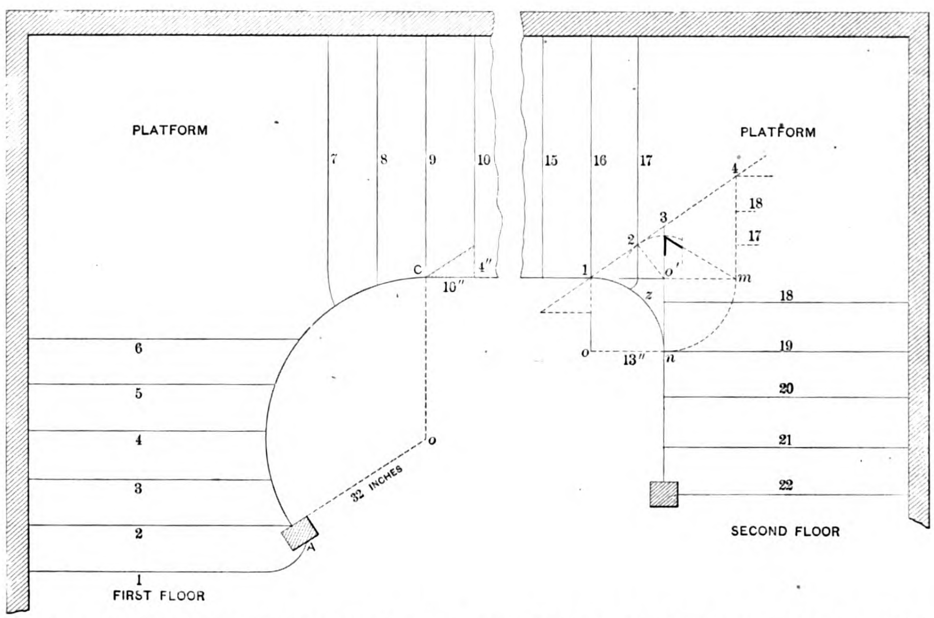


Fig. 65.—Plan of a Cylinder Stairway Containing Stretchout Curve More Than a Quadrant at the Starting, a Quarter Turn at the Intersection of the Two Flights and a Goose Neck Curve on the Rail Connecting the Newel of the Second Story Landing.

Some Problems in Stairbuilding.—X.

major axis in the points 3 and 3. Now fix the string to the pins, as shown, and with the pencil on the minor axis draw the curves, as shown, from the end a' of the mold to the end c'. Make the joints at each end square to the tangents, thus completing the form of the face mold.

The width of the mold at each end was taken from the bevels shown in diagram D. In order to find the bevels made *a n* of the diagram the same length as *a u* of the plan. Make *n m* the same length as the line *w m*, shown in the elevation; connect *m* with *a* and the angle at *m* will be the bevel to apply to the end c' of the mold.

Make *n* c' of diagram D equal in length to the line c' *t* of the elevation and connect c' with *a*. Then the angle at c' will be the bevel to apply to the end a' of the face mold, where the wreath connects to the newel.

The face mold is shown applied to the plank in Fig. 67, indicating the method of cutting out the material

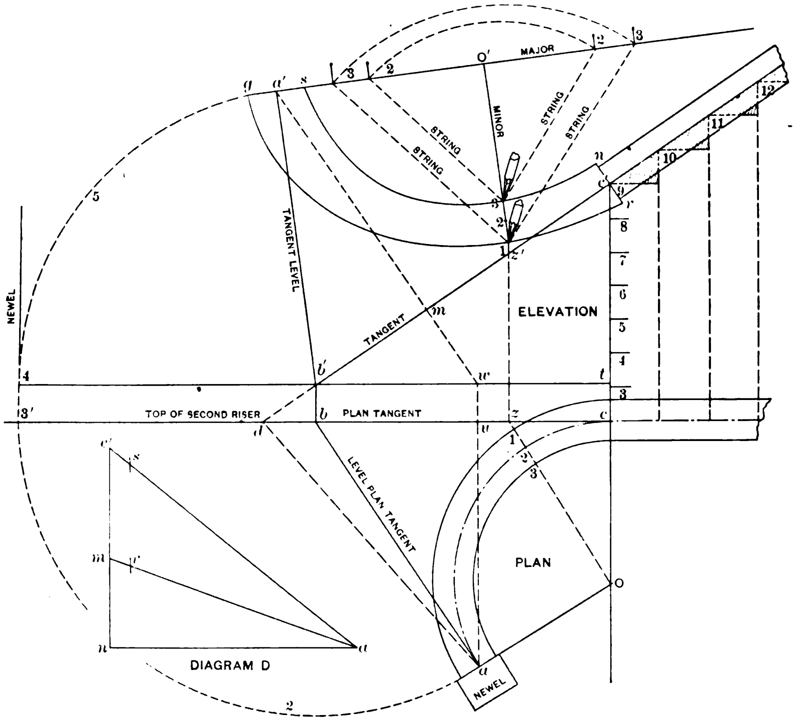


Fig. 66.—Plan, Elevation and Face Mold of the Stretchout Rail at the Starting of the Stairway Shown in the Previous Figure.

Some Problems in Stairbuilding.—X.

for the wreath. It will be observed that the material is cut out square to the face of the plank. The bevels are applied, as shown, to both ends; in this case reversely; that is, at the end a' toward the inside and at the end c' toward the outside of the wreath.

In Fig. 68 is shown the wreath after it is twisted and the bevels applied.

To lay out the face mold for the quarter turn placed between the second and third flights of stairs as indicated in the plan view, Fig. 65, place one leg of the compasses in the point o' as center and extend the other to *n;* turn over to *m* and then make *m* 4 equal in hight to the three risers which are contained in the quarter turn, namely, the 17th, 18th and 19th. From 4 draw the pitch of the flight above to 1, as shown in Fig. 65. Square to this line o' draw a line to 2.

Now draw the straight line X Y, as shown in Fig. 69, and transfer to it the points 1, 2, 3, 4 from the pitch line in Fig. 65, and from 2 in Fig. 69 draw a perpendicular line to the point 5. Now place one leg of the compass in the point 3, extend the other to 1 and turn over to 5, connect 5 with 3, which will give one tangent of the face mold, the other being from 3 to 4.

Make the joints at 4 and 5 square to the tangents. Place on the minor axis the point *z* at a distance from 3 equal to O *z* of the plan, Fig. 65. Make the width of the mold at this point equal to that of the plan rail and at each end ½ in. wider. Now draw the curves by bending a thin lath to touch the points thus found.

In Fig. 70 is shown the manner of laying out the mold by means of a string and pins, which needs no explanation further than what has already been given in connection with similar examples.

In Fig. 71 is shown a method of drawing the goose neck curve referred to earlier in this article. Commence by continuing the bottom of the landing rail through *b* to *o*. Drop a line from *b* to *a*, and make the line *a c* equal to *a b*. Draw a line from *c* to *o* square to the pitch line of the flight rail. Now with *o* as center draw the curves as indicated from *c* to *b*.

Note that the bottom curve in this stairway is similar to the curve shown in Fig. 60 for a wreath over a scroll curve. Study diligently the constructive lines as explained in that figure and also the view of it as presented in Fig. 64, demonstrating that with a knowledge of a method to develop a section cut obliquely through an irregular based block as shown in these figures a rail over a curve of the kind under consideration can easily be constructed.

Some Comments on Smoky Chimneys.

Some chimneys begin to smoke in the early autumn and although many are so constructed as to make it difficult for the expert to effectively remedy the fault, still they can be made to draw tolerably well if thoroughly cleaned during the summer months. Nearly all property owners at some time or other have experienced trouble with chimney flues; in fact, to the architect, the builder and the tenant alike the smoky chimney has been an abomination for decades. There are two principal causes why a chimney should smoke, says the *Building News and Engineering Journal.* A long flue full of cold air, and itself built of cold material, is one. The air is heavy owing to its low temperature; the lighter, heated gases in which the smoke is contained have great difficulty in forcing their way up, and it is necessary, as it is called, to create a draft. Every householder knows this elementary fact, owing to the difficulty of getting a flue to draw properly when the fire is first lighted in autumn, after a summer's rest. In large chimneys, used for manufacturing purposes, the difficulty is overcome by a forced draft, but in the ordinary, every-day house, such an expedient is impossible of adoption.

To prevent the flue from cooling too much or too suddenly is the only sure preventive. This, as all architects know, is done most surely by grouping the flues together in the middle of the house, so that all are kept more or less warm from their proximity to that from the kitchen range, which is in use all the year around.

If, as happens in many houses, there are distinctly two sections—one devoted to the kitchen and the other to the household—two such groups of chimneys have to be formed and the household group has often to run the risk of being idle for a great part of the year, unless, indeed, it is possible to carry up within it a flue from a basement heating apparatus which is used for hothouses.

From what has been said it will be recognized that to put a fireplace on an outside wall is to invite disaster. Many careless designers think little of doing this, considering nothing else than the position of the fireplace in the room, or the artistic effect of an external chimney. The discomfort caused by smoke, however, has to be reckoned with as well as the initial cost involved. It is clear that a flue which abuts upon the external air will cool quite rapidly, and the smoke difficulty may occur when lighting the fire in the morning after a hard night's frost, just as in the early autumn after a summer's rest. All the same, occasional external chimneys cannot be avoided. Where they are used, wisdom suggests that

hight to avoid the cause of the down-blow, or else a specially constructed chimney top, or cowl, must be used. There are many parts of Europe—hilly districts, most of them—where the open top is rare, the two sides of a flue being carried up, and a heavy stone lintel laid across, so that the smoke escapes laterally and not vertically while any depressed current is prevented from entering otherwise than across the flue top, passing through the opening rather than down the flue, and so helping rather than retarding the draft. A chimney such as this can generally be made picturesque, so that its adoption is often worth consideration; but the stone used as a capping must be sufficiently heavy to resist the jar of the sweep's brush without giving away in the slightest degree.

Ugly as they are, there can be no doubt as to the efficiency of some of them, particularly those of the revolving type, which always turn away from the direction of the wind, while the louvre pots and cowls have also proved very generally successful. That they are hideous beyond description is entirely another matter; but it only requires the recognition of the fact that a cowl or specially devised pot of some sort is essential for architects to select their pots in advance—for there are many forms of combined pot and cowl which are by no means inartistic, and at the same time efficient, and much more

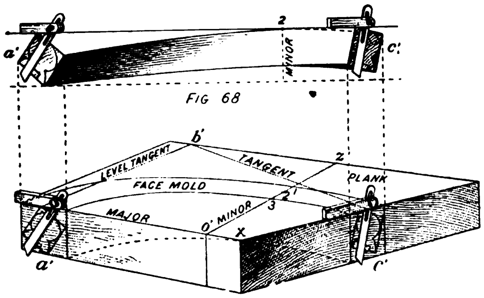


Fig. 67.

Fig. 67.—View of the Plank from Which the Wreath Is Cut Square to Its Surface and the Bevels Applied at Each End, Showing How the Wreath Is Twisted.

Fig. 68.—View of Wreath After It Is Twisted and the Bevels Applied.

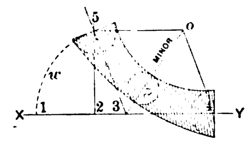


Fig. 69.—Face Mold Curves Described by Means of a Flexible Lath Bent to Touch Points Contained in the Curve.

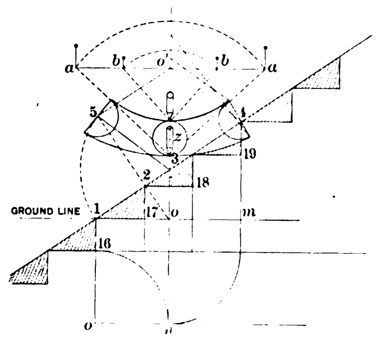


Fig. 70.—Diagram Showing How to Draw the Face Mold with String and Pins.

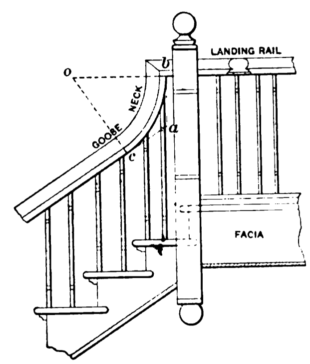


Fig. 71.—Partial Elevation of the Landing Newel, Landing Rail and Goose Neck on the Pitch Rail.

Some Problems in Stairbuilding.—X.

they should have a thick outer lining, instead of the usual 4½ in. of brick work, though comparatively few people, in these days of reducing prices to a minimum, think of doing this, except in high class work. Tall chimneys, too, where they rise for some distance above the roof, ought to be at least 9 in. thick externally, if rapid and undue cooling of the contained air is to be avoided. Yet it is rarely indeed that they are made so substantial as this, unless they are of stone instead of brick.

Another prolific cause of smoky chimneys is down-blow, resulting either from some accidental depression of the wind or the relative position of the chimney with regard to some neighboring tall building, or trees, or even a neighboring hill—anything, in fact, which can cause a depression in the current of air with a strong wind blowing from a certain quarter. This evil is most acute, as a rule, in towns; while fireplaces on the top story of a building are more affected than those from the rooms below. It is recognized by the smoke puffing out in sudden bursts, corresponding with the gusts of wind. The means of cure are obvious.

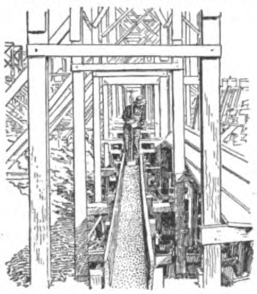
Either the chimney must be carried up to a sufficient

lasting than the metal erections commonly put up as afterthoughts—or else to design them specially.

Another cause of smoke is an ill-constructed grate, with, perhaps, too small a hood or canopy, and insufficient ventilation. Nowadays, the fireplace has received so much attention that a badly constructed one is much more difficult to obtain than formerly; but there are still many people who bottle up their rooms so completely that it is not easy for enough air to be supplied to carry the products of combustion up the flue. It must always be remembered that the flue, when the fire is lighted, acts as an outlet ventilator, up which there is a constant current of air. Consequently, there must be the same amount of air introduced into the room which the chimney serves, and, if this required amount is not allowed to pass in through sufficiently large openings, it will be drawn in through narrow cracks and so cause drafts. The natural inclination of the most people is to stop a draft by closing up the opening through which it passes, and so by reducing the inlets the supply of air to the grate becomes insufficient and the chimney "smokes," because the smoke is not carried off with sufficient rapidity.

WHAT BUILDERS ARE DOING.

A STRIKING feature of the present industrial situation is the extent to which building operations are being conducted in practically every section of the country. The new work under way and in contemplation consists very largely of buildings for dwelling purposes, with, however, here and there notable examples of development of suburban property in connection with some of the larger cities. Business sections, however, are not being neglected, and in many of the leading cities towering skyscrapers or mammoth structures for business purposes are in progress. The volume of operations is far ahead of a year ago, although not quite equal to the activity which prevailed up to the first part of September, 1907, at which time began the business depression which continued for so many months. Reports for August from half a hundred or more cities of the country show in the majority of instances gratifying gains as compared with the corresponding month last year, although in a few important centers a decided falling off is to be noted, particularly in such cities as Chicago, Pittsburgh, Baltimore, Seattle and Sacramento. These cities have, however, heretofore shown unusual activity, and as they are so widely scattered over the country the present falling off is not to be regarded as particularly significant.



Taking the country over, labor in all branches of the building industry is fairly well employed and only here and there is any serious friction to be noted. The general tendency appears to be toward the maintenance of cordial relations between workman and employer, and a due appreciation of the opportunity presented of promoting industrial development in the building line upon a scale which will compare in the end most favorable with years which have gone before.

Baltimore, Md.

Something of a failing off is to be noted in the amount of new work in the building line projected last month, the figures being not at all favorable when compared with the corresponding month a year ago. An interesting feature in connection with the statistics is the large increase in the number of permits last month in combination with the rather heavy falling off in the estimated cost of the improvements as compared with the same month in 1908. According to the figures available, there were 238 permits issued in August of the current year for new work, involving an estimated outlay of $449,270, while there were 188 permits issued in August a year ago for buildings, estimated to cost $711,932, with $924,215 in August, 1907, and $712,970 in August, 1906.

Buffalo, N. Y.

Considerable surprise was expressed in real estate and building circles by the report of the Bureau of Buildings for the month of August, which showed that 324 permits were taken out for the erection of buildings estimated to cost $795,000. As a general proposition August is usually the poorest month for building in the city, but this year activity has continued upon a most gratifying scale. The list of new work includes many large manufacturing concerns, as well as up to date dwellings. The figures compare with $724,000 for August last year and $661,000 in August, 1907.

Chicago, Ill.

It is now practically certain that the high record of building construction in Chicago set by the extraordinary activity of 1908, when permits representing a cost of $68,694,768 were issued by the Building Department, will this year be outstripped by a wide margin. With four months yet remaining, building permits are already within $6,650,138 of last year's total, and work now on the boards of architects and engineers give assurance of continued activity in building operations, which allowing for a considerable falling off from the high mark rate hitherto maintained will still make a phenomenal showing. August is the first month of the present year which has failed to decisively overtop the corresponding period of 1908. Permits were taken out in this month for 894 buildings, having 22,083 ft. frontage and costing $4,801,650, which compares with 922 buildings, 25,809 ft. frontage and cost of $5,641,050, in August, 1908.

For the first eight months of this year the figures are as follows: 7936 buildings, 214,329 ft. frontage, costing $62,044,630. If the present average is maintained through the remainder of the year the aggregate cost of new buildings will pass beyond $90,000,000, or more than double the highest figure ever reached in any previous year of the city's history. The contract for construction of the New Sherman House, to cost approximately $2,000,000, has been let, and the work of tearing down the building now occupying the site will be started about the middle of September.

Owing to the strife that has arisen between two rival labor organizations in the building trades work has been partially interrupted on the La Salle and Blackstone hotels, both of which are nearing completion. Unless an amicable adjustment of the dispute is soon reached, it is feared that the trouble may spread and strikes be called on other buildings. It is hoped, however, that a satisfactory settlement of the points at issue may be reached, so that no obstacle may be presented to the realization of an unrivaled season of prosperity in building construction.

Cleveland, Ohio

A good volume of new building work continues to come out in this city. Practically all the work in the way of large office and store buildings planned for this year was contracted for earlier in the season and is now under construction, but contracts are being placed for considerable small work, including small store buildings, terraces and dwelling houses, and it is expected that builders will be kept busy through the late fall.

Permits issued by the Building Inspector's office during August show only a slight falling off as compared with July. During the month there were issued permits for 552 buildings, to cost $1,092,130, as compared with 674 permits, aggregating $921,701, issued during the corresponding month of 1908.

It is expected that there will be an advance in prices in some lines of building material, particularly lumber, within a short time, and the present prices are encouraging prospective home builders to arrange for the erection of dwelling houses before an advance is made.

The most successful clambake and shore outing ever held by the Builders' Exchange of Cleveland was conducted by the Entertainment Committee of that organization on the afternoon and evening of September 2. The event this year was held at the Country Auto Club, whose beautiful grounds and buildings are located on the shore of Lake Erie east of the city. The afternoon was very pleasant and members of the exchange to the number of about 125 enjoyed the programme of entertainment. Many parties were made up for automobile trips to the club and others reached that destination on the street cars. A game of indoor baseball was played on the large lawn in front of the clubhouse at 4 o'clock, between teams led by W. A. Fay and John Thompson as captains. President McMillan served as umpire for the bases and Chairman Klumph of the Entertainment Committee officiated as umpire behind the bat. The game was hotly contested and provided lively amusement for the audience, ending in a score of 13 to 12 in favor of Fay's team. Sufficient energy was still left after the game for a contest at football, in which all hands and feet joined, the game being of the old fashioned character and requiring the delivery of the ball at one of the opposing goals.

The party assembled at the tables at 6.30 o'clock, taxing the maximum capacity of the club dining rooms. The tables were decorated with asters of varied colors and with candelabra. Each member found a souvenir photograph of the clubhouse and grounds with a printed *menu* at his place. The *menu* was the most enjoyable feast ever set before members of the exchange at a similar affair.

Following the dinner was a period of story telling and social intercourse. The company left the club about 10 o'clock, well pleased with the festivities of the occasion.

Denver, Colo.

The volume of building operations at present in progress is closely approximating that of the corresponding season last year, so that the difference in the amount of capital involved in the two periods is comparatively slight. As has been the case for some little time past the bulk of the operations relate to residence construction, the report of Building Inspector R. Willison for the month of August showing permits to have been issued for 117 brick dwellings, to cost $343,500, and for nine frame dwellings, to cost $5900. Plans for an apartment to cost $30,000 were filed, also for two terraces to cost $23,000. Permits were taken out for 15 business buildings, to cost $89,400; for two warehouses, to cost $27,000; for a church, to cost $12,000, and a hotel, to cost $30,000.

According to the authority in question there were 270 permits issued in August for building improvements to cost $700,595, while in August last year 248 permits were taken out for improvements involving an outlay of $664,310.

The record for the eight months of the current year shows a decided gain over the same period last year, and everything points to a steady growth all along the line. From January 1 to August 31 of the current year 2361 permits were issued for buildings to cost $8,331,073, while in the corresponding period of last year 2105 permits were taken out for building improvements to cost $6,556,695.

Los Angeles, Cal.

Since the opening of August there has been a steady increase in activity in all of the building trades. A large amount of new work has been started and arrangements have been made for the construction of many more. During August 750 permits were issued for buildings estimated to cost $1,555,199. This is not only considerably more than for the month preceding, but is larger than for any previous August in the history of the city.

In August, last year, the total value of the building permits was only $954,271; in August, 1907, it was $1,342,006, and for August, 1906, it was $1,476,522. The improved showing is largely due to a resumption in the building of the larger sort of business structures. During the month four Class A buildings, with a total valuation of $464,700, were authorized, while the Class C buildings reached a total of nearly $100,000. In frame construction, the feature of the month was the building of two-story buildings. Of these, 44 were granted permits, the total valuation reaching nearly $300,000. The proportion of the valuation of the one-story frame permits shows a marked falling off. Formerly the valuation of the permits for one-story buildings was about one-half of the whole, but last month the one-story frame buildings amounted to only about one-fourth of the total. Local architects report more business than at any time during the past two years.

Louisville, Ky.

A rather singular coincidence in connection with the building operations in the city is that last month identically the same number of permits were issued as in August last year. The estimated cost of the improvements, however, differed radically, showing a falling off of more than 25 per cent. In both months there were 261 permits issued, but in August this year the total value of the improvements was $253,362, while in August a year ago the valuation was $339,813.

The twenty-second annual outing of the members of the Building Contractors' Exchange was held at Hike's Point on September 5, and was a most enjoyable affair. There were several hundred members and their friends present, and while all sorts of sport was indulged in the main feature was the baseball game. It was a regular nine inning affair, and, according to the official score, the victors were the subcontractors against the general contractors by a score of 33 to 29. The humor of the situation is found in the fact that at the beginning of the ninth inning the score was 29 to 16 in favor of the general contractors. With 14 runs necessary to win, however, the subcontractors were not dismayed, and they fully demonstrated that the "Bloody Ninth" was something more than a mere tradition.

At the conclusion of the ball game dinner was served with fried chicken in regulation country style, the pivot around which all the other good things revolved.

New York City.

As the season advances new building work is projected upon a fairly liberal scale and the showing for the three leading boroughs is most gratifying when compared with the corresponding period a year ago. The month of August shows that despite the lull which followed the cessation of the recent building code agitation the building industry made a better record in new construction projects as well as in improvements of various kinds to existing buildings than was the case last year, while in the superior character of this year's new construction August far surpasses any previous midsummer period. It is apparent from the figures available so far as regards construction of new apartment houses, which were the most to be affected by the building code agitation, the condition is practically normal for the season.

According to the report of Building Superintendent Edward S. Murphy permits were issued in August in the Borough of Manhattan for 38 buildings, to cost $5,623,332, while in August last year 87 permits were taken out for new work estimated to cost $3,976,700. Including alterations, the grand total for last month was 273 permits, involving an estimated outlay of $6,659,487, as against 289 permits, involving an outlay of $4,448,155, in August a year ago. As regards tenement house construction 12 permits were issued for work costing $1,060,000, while in August last year permits were taken out for 16 houses of this class to cost $1,206,000. Seven loft buildings were projected, involving an estimated outlay of $2,752,350, while the single office building for which a permit was issued—the new Heidelburg Tower Building, at the intersection of Broadway, Seventh avenue and Forty-second street—calls for an outlay of $800,000. In August of last year permits were issued for six office buildings, to cost $1,248,750. Plans for four places of amusement were filed, to cost $550,000, against four a year ago, to cost $410,000.

For the first eight months of the current year there was an aggregate capital investment for new and old buildings of $113,105,902, representing a total of 3063 different projects and indicating a gain of 562 in the number of improvements planned and $50,705,280 in the amount of capital involved as compared with the corresponding months of last year.

In the Borough of the Bronx permits were issued in August for 154 buildings, to cost $4,356,350, as against permits for 169 buildings, costing $1,536,150, in August last year.

In the Borough of Brooklyn building operations show the continued advance which has marked the situation for many months past. There were 441 permits issued, covering 1433 buildings estimated to cost $6,958,625. There were 616 permits for alterations, involving 677 buildings and costing $554,985, while the number of new buildings completed in August was 628. This gives a total for August of 2110 buildings, estimated to cost $7,513,610.

In August, 1908, there were 267 permits issued for the construction of 556 buildings, estimated to cost $4,453,780, while 493 permits were issued for alterations affecting 553 buildings and costing $810,770. The total number of buildings completed was 551.

The totals for August were therefore 1109 buildings, estimated to cost $5,264,550.

In the Borough of Queens the total value of new building work projected in August was $1,045,575, as against $957,085 in August a year ago.

Omaha, Neb.

At the present rate of progress the year 1909 is likely to witness a record in building operations unequaled in any previous year in the history of the city. Not only is building active, but there is a sufficient amount in contemplation to justify the optimistic feeling which prevails among architects and contractors generally. Permits were issued last month for buildings to cost $721,365, which figures compare with buildings to cost $485,640 in August, 1908.

For the eight months of the current year the total involved is $5,080,005, and for the corresponding period last year permits were issued for building improvements to cost $2,800,215, with a total for the entire 12 months of $4,590,650.

Philadelphia, Pa.

All records for the month of August, as shown by the statistics of the Bureau of Building Inspection, were broken during the past month, when 814 permits were issued, covering 1466 operations, the estimated cost of which was $6,338,875. This exceeds the expenditure for the same month last year by over $4,000,000 and that of July by nearly $2,500,000. It also breaks the record made in August during the banner building year, 1906, by over $3,000,000. The total expenditure authorized for building work during the past eight months of the year totals $32,131,220, an increase of $13,500,000 as compared to the same period last year, and exceeds that for the same period during the record year 1906 by over $2,000,000.

As was expected, permits issued by the department during August for the erection of office buildings, while not numerous, represented quite a heavy expenditure, those for the Curtis Building and the new Morris Building contributing the major portion of the $2,801,000 credited to office buildings during the month. Dwelling operations continue very active, and while there was a slight decrease in the expenditure authorized for two-story dwellings, $1,158,950 in August as compared to $1,489,990 in July, the work started in three-story dwellings shows an increase, on the same comparative basis, of over $350,000. More contracts for municipal work were closed during the past month, the aggregate estimated cost of which was over $200,000, with considerable more work of this class pending.

The building movement in this territory appears to be perfectly sound and all doubts as to a continuation of the present active condition of trade seems to have been removed. The fall season in dwelling houses will, it is believed, be brisk owing to the generally improved conditions of business in practically all lines. On the whole the situation in the building trades is exceedingly bright, and with four fairly active months still ahead the trade looks for the breaking of all records during the current year.

Pittsburgh, Pa.

A considerable shrinkage is to be noted in the value of the new work projected last month in this city, as compared with a year ago, although the permits issued were practically the same in both periods. The feeling, however, among architects, builders and real estate men is rather optimistic than otherwise, and all are looking forward to a total of operations for the year, which will prove highly gratifying. It is, however, extremely doubtful if the aggregate will equal the tremendous activity which prevailed in the city in 1902 to 1906, inclusive, when the figures ran a trifle more than $17,500,000 for the 12 months of 1904.

According to the figures of the Building Department, 332 permits were issued in August for improvements, estimated to cost $1,096,301, while in August last year there were 337 permits issued for improvements, costing $1,481,308. In 1907 the total was $2,076,428.

Portland, Ore.

Building operations in Portland, after a drop in June as compared with the earlier months of the year, are steadily climbing again. The number of permits issued in August was 473, for building estimated to cost $996,345. This is a gain of $85,000 over the month of July and of $225,000 over the month of August, 1909.

For the eight months of 1909 ending August 31 the total value of the building operations was $8,213,150, as compared with $6,698,371 for the same period in 1908. This shows a gain of 22½ per cent. Builders state that more is being spent for new work and less for repairs, remodeling, reconstruction, &c., than was the case a year ago. The average value of the permits now being issued is running considerably higher than last year.

Rochester, N. Y.

The report of Fire Marshal Herbert W. Pierce for August shows a steady increase in building operations, although the record is not quite up to that of the same period in 1907, when up to the first of September building operations were being conducted upon an enormous scale for this city. The record, however, is considerably in excess of August last year.

In all 290 permits were issued last month, calling for an estimated outlay of $861,741, of which $804,364 was the estimated cost of new buildings and $57,377 the cost for improvements to old structures. Of the new buildings projected 172 were dwellings, estimated to cost $541,888. In August last year 199 permits were issued, calling for an outlay of $635,381.

Salt Lake City, Utah.

The issuing of a permit for $1,200,000 for the Utah Hotel the last week in August ran the total for the permits for the month up to $1,723,420. This is the highest figure ever reached in the building records of the city for a single month. The record for August, 1908, was $388,500.

The record for the first eight months of the city was $5,178,420, or $500,000 more than for the entire year of 1908. Aside from the one large building, there was during the last month rather more activity than during the earlier months of the year.

San Francisco, Cal.

The actual building work under way in San Francisco shows some improvement, though the volume begun in August was practically the same as for the month preceding, the figures being $2,186,064 and $2,154,999, respectively. As compared with August, 1908, there was a slight drop, the value of the permits issued in that month being $2,450,000. There has, however, been a healthy improvement in the value of the contracts actually let, and as these precede the issuing of permits it is taken to indicate that there will be an improved showing for fall. The contracts let last month amounted to $2,588,723, of which $1,149,804 were for frame construction, $1,298,423 for brick and stone and $140,496 for alterations. This brings the total of the building contracts actually let and recorded since the fire of 1906 up to $142,141,962.

There appears to have been something of a revival in brick and stone construction, due to the rapid filling up of the store and office buildings on Market and other downtown streets and to the growing tendency for tenants to avoid the temporary wooden buildings. More work is under way and more in immediate prospect inside the fire limits than for some months past. In frame construction the erection of flats is about the only line that shows any increase in activity.

The situation in materials shows considerable change this month, lumber being firmer, with a certainty of an advance, and both concrete and brick rather lower. The log and mill men in the northern lumber camps have given notice of an advance in prices on October 1, and this has caused so decided a firmness in the San Francisco market that it practically amounts to an advance. Supplies in the city and at other points about San Francisco Bay are ample for all prospective requirements, though the stock on hand is not so large as it was some months ago. Whatever agreement existed among the leading brick manufacturers in the matter of prices seems to have been dissolved, as no serious attempt at uniformity is now being made. The price has dropped from $9 to $7, and there is no great stability even at the lower figure. Cement is still nominally quoted at $1.90 per barrel, but the supply exceeds the demand at that figure, and it is claimed that it is held nominally at $1.90 merely because some large public contracts are based on "the market price." It is asserted that sales have been made at $1.50.

Most lines of building stone are very firm, some large contracts having been let recently. Both granite and sandstone are particularly active. One of the largest contracts of the year in stone was the contract for the granite for two fronts for the new Union Trust Building, at the corner of O'Farrell and Market streets. This job will include a number of large columns of polished granite. White limestone for the new Mechanics' Library and for the Scottish Rites Temple is already cut. The stone fronts of these buildings are to be among the most elaborate in the city. The Hall of Justice, to be built by the municipality of San Francisco, will have California sandstone on three frontages, the stone for which is now being cut.

General plans have been prepared for the construction of a new Mission Dolores adjoining the historic old mission of the same name in San Francisco. The adobe structure, probably the oldest building in San Francisco, passed through the great earthquake and fire of three years ago without damage and will be preserved. The new plans follow the model of the old structure, but the building will be much larger. It has not yet been decided whether it will be of stone or reinforced concrete. It is planned to spend $150,000 on the work.

Seattle, Wash.

The month of August showed a decided falling off in the value of new work for which permits were issued, both as compared with the previous month and with the corresponding month a year ago. Frame dwellings account for a goodly percentage of the total, being slightly in excess of the month before as regards this class of work. The statistical report of Francis W. Grant, Superintendent of the Department of Buildings, shows 1143 permits to have been issued, calling for an estimated outlay of $1,189,655, these figures contrasting with 1349 permits for improvements to cost $1,882,678 in August last year.

There were 328 permits issued for frame buildings to be used for business purposes, estimated to cost $214,195, while brick construction called for an outlay of $22,500. There were four reinforced concrete buildings projected, involving an estimated outlay of $138,000.

From January 1 to August 31, inclusive, 10,120 permits were issued for building operations to cost $13,569,720, while in the corresponding period last year 8489 permits were issued calling for an outlay of $7,940,178, from which it will be seen that the current year's operations are far ahead of those of 1908.

At a meeting of the general contractors of the city held in the Chamber of Commerce on August 24 a reorganization of the Master Builders' Association was perfected. The principal reason for the reorganization was the fact that the former association did not include a majority of the contractors of the city. Martin T. Chamberlain, president of the Chamberlain Construction Company, was elected temporary president, and committees on organization were appointed to report at a subsequent meeting.

St. Louis, Mo.

According to the month-end report of Building Commissioner Smith, operations in August were more than double the volume for the same month a year ago, and the outlook is for a very fair showing taking the year through. There were 848 permits issued for building improvements, valued at $2,962,959, as compared with 863 permits for new buildings, to cost $1,415,684 in August a year ago.

Of last month's totals 232 permits were issued for the construction of new brick houses, estimated to cost $2,585,727, against 263 houses, costing $1,216,396 in August, 1908. While there was a falling off of 43 in the number of permits issued for new frame buildings last month, the cost of construction was greater than a year ago by more than $12,000.

Topeka, Kan.

An interesting feature of the building situation here in this city is that August was one of the best months in the year, despite the belief that residence building was ended for the season. From the present outlook the construction of homes will continue into cold weather, the showing made up to the present time having acted as a stimulus to those who have been inclined to hold back in regard to construction work. During August permits were taken out for buildings to cost $511,490, as compared with $84,645 in July, $154,767 in June and $210,825 in May, the latter being the second largest month this year.

For the eight months the total is $1,260,727, the significance of which is found in the fact that never before have the permits of any one year exceeded the million dollar mark. It is now thought that the estimated cost of building work for 1909 will reach the two million dollar mark by the end of December.

Notes.

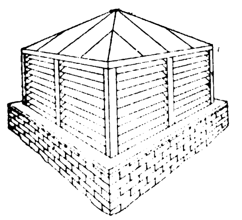
The report compiled in the office of the Superintendent of Buildings in Kansas City, Mo., shows the cost of the improvements for which permits were filed in August to be $1,137,135. In the same month last year the value of the improvements for which permits were issued was $943,345.

The leading builders and contractors of Petaluma, Cal., have recently perfected an organization and filed articles of incorporation of the Builders' Exchange of Petaluma. The life of the exchange is to be 50 years, and the Board of Directors for the first year are: H. S. McCarger, N. B. Ingerson, H. P. Vogensen, R. A. Haskins, C. F. Turner, E. L. Young and F. Emenogger.

CONSTRUCTING A LOUVRE VENTILATOR.

BY HENRY HALL.

THERE has been more or less discussion in the past relative to the size and construction of ventilators for use upon buildings of various kinds, and thinking that some particulars of a louvre ventilator may not be without interest to a large class of the readers of this journal, I will describe the method employed by designers under whom I have worked. At the outset it should be stated that by this scheme of building a louvre structure steel shades are required, although the following plan eliminates preliminary wrought ironwork and allows the use of standard or shop design of louvre frame and skylight.



The design which is presented in the small illustration at the commencement of this article is susceptible of modification, but it may suggest a way to use the reader's own standard skylight. It is practically an ordinary skylight job except that instead of glass, sheet metal is used to make the roof, as is the case with ventilators over the stage of the Brooklyn Academy of Music.

A condensed vertical section on the line A B of Fig. 1, which represents a plan view, is shown in Fig. 4 and is a plan of a job whose outside wall or curb measurement is 6 x 6 ft. By this method the limitation of size is about the same as a turret skylight. In fact, by enlarging the sections and properly bracing the part marked A in Fig. 4 there is no limit. For an extra large ventilator this part can be tied to prevent spreading owing to thrust of the roof, as shown in the smaller sketch, Fig. 2. Note the gutter. As these ventilators are generally some 12 or more louvers in hight, it is advisable to use gutters as shown.

A perspective of the ventilator is given in the small illustration at the commencement of this article. The method by which the roof sheets are cut and formed is indicated by Fig. 3. Some are riveted to curb and bars, as may be seen from an inspection of Fig. 5. By reason of having no support other than on the glass rest of bars and curb the sheets will have a tendency to sag, therefore the bars must never be spaced more than 15 in. and sheets should be deeply crimped laterally.

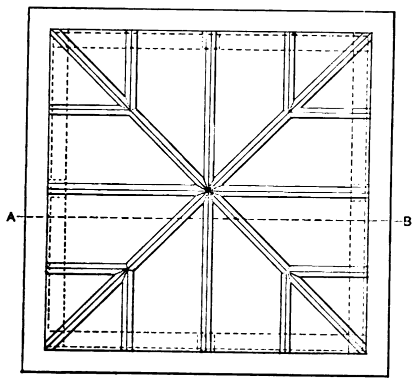


Fig. 1.—Plan of Louvre Ventilator.

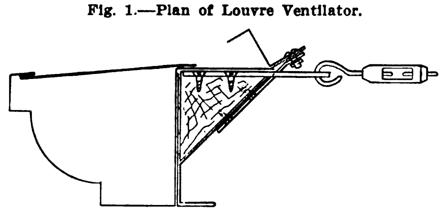


Fig. 2.—Scheme to Prevent Skylight Spreading.

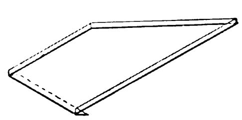


Fig. 3.—Plan of Forming Roof Sheets.

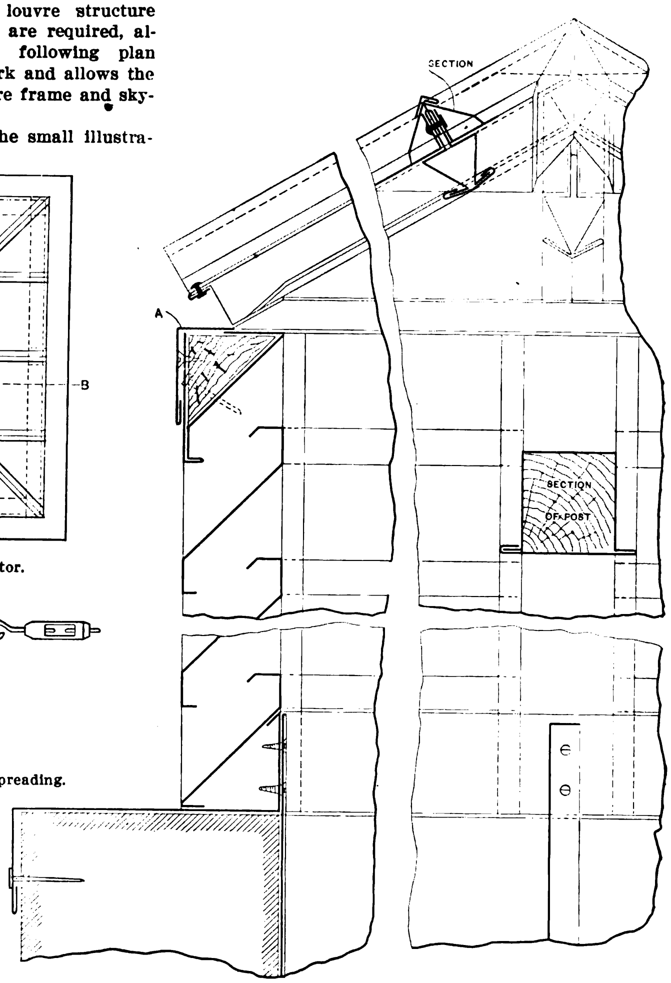


Fig. 4.—Louvre Ventilator Without Preliminary Steel Shapes.

Constructing a Louvre Ventilator.—Miscellaneous Details.

THE latest addition to the colony of pretentious apartment houses in the Washington Heights section of New York City is the 13 story structure to cost $1,700,000 and cover a plot 208 x 185 ft., at Riverside Drive and 156th and 157th streets. The building will have 12 apartments on a floor, running from 6 to 10 rooms each, and with two and three bathrooms. It will have four elevators and a series of exterior courts. The architects are W. L. Rouse of 11 East Forty-third street and L. A. Goldstone, 110 West Thirty-fourth street, New York City.

WATER SUPPLY FOR ISOLATED BUILDINGS.

SOME interesting information and valuable suggestions were given in a medal essay read by Harold G. Turner before a meeting of the Institute of Sanitary Engineers of England on the collection and storage of water for domestic purposes in connection with farmhouses and villages. The particulars referring to the sources of water available and to the methods of delivering it to the isolated building or small colony of buildings will be of interest, and accordingly the following notes are taken from the essay:

Water for domestic use is arranged in the list given below, according to palatability and wholesomeness:

Wholesome..	1. Spring water......... 2. Deep well water....... 3. Upland surface water..	Very palatable.
Suspicious...	4. Stored rain water..... 5. Surface water from cultivated land.........	Moderately palatable
Dangerous...	6. River water to which sewage gains access.. 7. Shallow well water....	Palatable.

Water from Springs.

Spring water takes the most prominent position in the list already given, but it must not be supposed that it is necessarily pure, as numerous instances are recorded of contamination from far sources through percolation.

Intermittent springs are practically valueless for a water supply, as they absolutely depend upon recent rainfall, and being of the same nature as shallow wells, their yield is to be regarded with suspicion.

Constant springs are the outcrop of vast subterranean accumulations of water. Where the water has to pass through a chalk formation until held up by the green sand below it contains large quantities of carbonate of lime, this being held in solution by the excess of carbon dioxide acquired by all spring water in their passage through the superficial layers of the soil, which contain some 250 times more of this gas than the atmosphere. The carbonate of lime causes temporary hardness, which may be overcome by precipitation of the carbonates through boiling, or by Clark's process of adding 1 oz. of quicklime to each 1000 gal. of water for every degree of hardness. A degree of hardness is measured by the quantity of carbonate of line (common chalk) in a gallon of water, 1 grain representing 1 degree of hardness.

Oolite springs are the outcrop from sources deeper than the chalk, and give pure but hard water, the difference when compared with chalk springs being in the existence of sulphate of lime and magnesia as well as carbonates, the combination forming permanent hardness— *i. e.*, hardness not removable by the methods mentioned.

Soft and Hard Water.

Soft waters have been classed as waters up to 6 degrees of hardness; hard waters, over 6 degrees of hardness. Soft water uses less soap, is more economical for cooking and other domestic purposes, leaves less "fur" or "scale" after boiling in utensils or boilers, and is much preferred in the manufacture of bread, porter, stout, &c. Hard water has no action upon lead (or seldom any, but all waters should be carefully tested for their action upon metals). It is indispensable for the manufacture of pale ales, and it encourages the collection of rain water for domestic purposes, thus effecting a considerable economy in the public supply. Springs from magnesian limestone formations yield a pure and plentiful supply of permanently hard water.

It is seldom that springs are of sufficient magnitude to serve a village, but they are a most useful and satisfactory source for farmhouses. The position of the outcrop is of the utmost importance. Should it be at a higher level than the building it is proposed to supply and well away from any source of contamination, the conditions are very favorable, and the water may be conducted to the premises by gravitation. Naturally the outcrop is usually situated below the dwellings, unless the latter are at a very low level indeed, and then, owing to the dip in the various strata, there exists the probability of the spring being polluted by the refuse from the house it is intended to supply. With a low outcrop the problem of transportation presents itself.

Power of Hydraulic Rams.

Hydraulic rams provide a very simple and inexpensive means of raising water, in fact the cheapest method known. When properly designed and fixed they are more efficient than turbines or pumps, an efficiency of over 80 per cent. having been obtained. A simple method of calculating water raised is to add two naughts to the number of gallons available per minute and call it gallons raised 100 ft. high per 24 hr.

The correct formula for hydraulic rams is as follows: To determine the amount of water in United States gallons raised by a hydraulic ram multiply the number of gallons per minute to work the ram by the fall which this water has in feet, divide this product by the number of feet which the water must be lifted above the ram, and multiply the quotient by 0.7 and the result will be in gallons. To find the number of gallons required per minute to work the ram, multiply the number of gallons of water to be raised by the lift in feet, divide this product by the available fall of the water working the ram, and divide this quotient by 0.7. To find the fall in feet of water necessary to work a ram, multiply the weight of the water which must be lifted by the number of feet which it must be lifted, divide this product by the number of gallons available to work the ram, and divide this quotient by 0.7. The diameter of the supply pipe in inches is determined by multiplying the square root by the number of gallons of water used in working the ram by 1.58, and to determine the diameter of the delivery pipe multiply the square root of the number of gallons used for working the ram by 0.82. The contents of the air vessel should be equal to the contents of the rising main. A greater fall than 10 ft. is, he says, to be avoided, if possible, on account of the wear and tear on the valves. He says that falls of 2½ to 40 ft. have been utilized to lift water 400 ft.

For lifts up to 27 ft. hand suction pumps are valuable, and a hand force pump may be used for higher lifts to raise the water to a tank on the roof of the house. The spring should be excavated to form a reservoir, the sides built up with bricks in cement backed with puddle, a suitable overflow and cover provided, and the whole spring fenced in. All this can be done for a small outlay, and it insures a good supply for a limited population.

The variation in the character of spring water from chalk, oolite (mountain limestone) and magnesian limestone formations is equally present in wells, which are simply artificial springs dependent upon rainfall, about one-third of which penetrates the various formations until held up by an impermeable stratum, over which it flows until a river or sea is reached.

Three Kinds of Wells.

Of the three kinds of wells—surface, deep and artesian—surface wells may be subdivided into three; dripping, draw and pump wells; the difference being simply in the depth at which water is found, necessitating various methods of obtaining the water as indicated by the names. They are supplied by water held up by the first impervious stratum, and the supply is therefore mixed with water from cultivated lands, farmyards, cesspools, &c., and is seldom pure. Its existing pureness, if found, may be destroyed at any time by the cultivation of an adjacent plot of land, &c. Such wells are a very common source of supply to isolated dwellings, but should not be adopted where any other source is available, and in any event should be subjected to a constant and strict inspection.

Deep wells lie under the stratum supporting shallow well water, and their contents are not subsoil water that has simply percolated from the surface, but water that has filtered through porous ground at a higher level, and to obtain it the first impervious stratum must be pierced and the water raised by a force pump. These wells are probably the most suitable sources for small communities. They are usually, but not necessarily, over 100 ft. in depth, and should be lined with steel tubing, or brickwork in cement with a clay puddle backing from the surface down to well below the first impervious stratum to keep out subsoil water, and, of course, as far below this level as may be necessary for the support of the walls. The supply can be often much augmented by driving headings from the well into the water bearing strata, as this increases the well capacity, and often connects new water veins with the well. Suction pumps are valueless for extracting water from deep wells, as their theoretical lift is only 33.8 ft. Force pumps must, therefore, be resorted to.

Artesian Wells.

Artesian wells are formed by boring through the first and second impermeable layers—that is, through shallow and deep well levels—into porous strata, which is depressed in the shape of a bowl; and, being underlaid and overlaid by impermeable strata, and having its catchment area at a high level, naturally contains water under considerable pressure, with the result that the outcrop at the well is often below water level, and in any event the water rises to a high level in the bore.

It is seldom that artesian wells are suitable for the supply of rural districts, as their cost and supply are very doubtful matters. One such well at Greville, France, took seven years to bore, at a cost of $70,000. The depth was 1807 ft., the supply 800,000 per day. So much sand was brought up by the water that on several occasions the bore became choked and the pipes had to be drawn and cleaned. It was 12 months after the tapping of the water that it became fit for drinking purposes.

Another well at Passy, near Greville, took six years to construct, its depth being 1923 ft. and its normal output 4,465,600 gal. As early as 1860 there were 50 wells in the Great Sahara Desert, giving a combined output of 7,920,000 gal. per day. Nearer home, and in more recent times, artesian wells were constructed at Clapham road, 425 ft. deep, outpouring 840,000 gal. per day, and at Birkenhead, 400 ft. deep, outpouring 2,000,000 gal. The cost of artesian wells has been much reduced by better methods and tools since the Greville boring was commenced in 1835, but it will readily be seen that, although the cost may not be excessive where a huge supply is required for a town, it is out of the question for small communities unless combined.

As mentioned before, upland surfaces are seldom utilized by villages, but this is a source of supply not necessarily out of the reach of a rural district, and occasionally villages situated near a probable catchment area are able to use them. When water is collected from elevated uncultivated ground it very nearly approaches rain water in character, being soft, wholesome and palatable. If from peaty moorlands, however, it possesses an unfortunate action upon lead, and is therefore unsuitable for supply, unless treated with chalk or lime to remove the peaty acids. A small community proposing to take its water from an upland surface should pick out a little mountain stream of adequate size, and trace it to its source for the purpose of ascertaining whether or no there exists a possibility of pollution from dwellings, cultivated lands, &c.

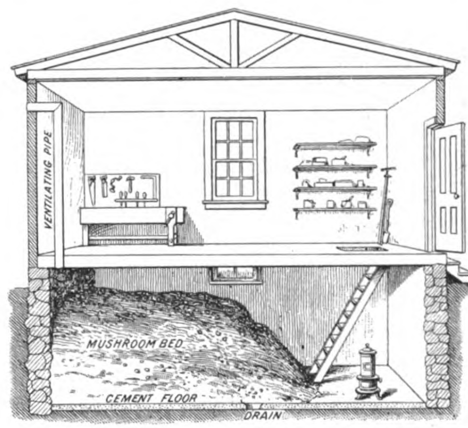
ONE of the latest additions to the colony of commercial buildings which are now crowding out the old residences along that section of Fifth Avenue which was once a most fashionable quarter, is the 12-story store, office and loft building under way at the northwest corner of Fifth Avenue and 43rd Street, Borough of Manhattan, N. Y. This is said to be one of the most valuable corners in Fifth Avenue and work upon the new building will be pushed as rapidly as possible so that its doors will be open for business on or before the first of February next year. The widening of Fifth Avenue, the removal of porticos and stoops, and its ever increasing land values all tend to compel the eventual improvement of its remaining old buildings with others of the character just described.

A Mushroom Cellar and Workshop.

BY A. S. ATKINSON.

A combination mushroom cellar and workshop is a most useful adjunct to the farm or rural home where it is necessary and desirable to economize in space and material. The growing of mushrooms is quite common today on thousands of small country places, and those very fond of these edibles resort to all sorts of methods to raise sufficient for the home table. The cellar of the ordinary house is not a good place for mushroom culture, and very few barns are provided with a good cellar suitable for the work.

A country resident who wished to raise his own mushrooms decided that he would build a cellar for this purpose back of his house, but as there would necessarily be a great amount of waste space in such a structure he built the combination house here shown. He wanted a mushroom cellar at least 14 x 14 ft., but in the plans submitted the cellar was made 18 x 20. An excavation



A Mushroom Cellar and Workshop.

was dug 6 ft. below the soil line, and the bottom cemented with 2 in. of good concrete. An opening was left in the middle to serve as a drain. The walls of the cellar were made a foot thick and composed of field stones laid in cement. These stones were of all sizes and shapes, and no attempt was made to secure a particularly even surface except on the inside. Some of the stones projected several inches beyond the line into the soil, as it was easier to do this than to break them off even. The work of building the walls below the soil line was, therefore, so simple that any one could do it.

A foot above the soil line 2 x 6 beams were carried across to furnish a foundation for the floor above. Space was left in the walls for two shallow windows on opposite sides of the cellar. The tops of these windows projected above the soil line, but the lower half was below it. The dirt was scooped out to a level of the stone sills so as to admit light. This made it simple to exclude the light and cold from the cellar if necessary by piling straw or litter into the holes. When open the windows admitted sufficient light to make the cellar suitable for mushroom culture.

Above the cellar a ventilation pipe was carried to the upper part of the building. A trap door at the other end when left open produced a circulation in the cellar. It was possible in this way to secure just the atmosphere desired, and also any degree of moisture necessary. The heating of a mushroom cellar is chiefly by the manure piled in the bed, but an oil stove was used for increasing this if needed. Any fumes from the oil stove escaped up the ventilation tube, and any excess of moisture dripped away through the drain in the middle of the floor.

The workshop above the cellar was inclosed by ordinary joists and sidings, with a shingle roof to produce an artistic effect. The upper part of the building had sufficient room to keep the tools and implements of carpentering and gardening, and also gave space for the owner to work at little odd jobs. Two windows were placed in this workshop, so that ample light was obtained. A door at one end led directly into the workshop, and a trap door with a pair of steps admitted one to the mushroom cellar.

The whole structure cost less than $75, including the labor and lumber. From this mushroom cellar the owner raised all the mushrooms his family used in one year, and besides he sold nearly $25 worth at good market rates. He estimates that he could pay for the building in one season if he sold all of his mushrooms, and after that he could secure big interest on his investment. But the design is intended for a private home and is not a commercial affair, although one on a larger scale could be built for this purpose.

Law in the Building Trades.

By A. L. H. Street.

EFFECT OF PROVISIONS IN BUILDING CONTRACTS AND BONDS.

Three dollars a day was a reasonable sum to be agreed upon as liquidated damages to be paid by a building contractor for his failure to complete a $13,000 hotel within the time specified in his contract. Where a building contract required the building to be completed by December 6, but the time was extended to December 23, in accordance with the contract, the contractors having been delayed by strikes, no default occurred until the later date, and hence notice given then to the surety on the contractors' bond sufficiently complied with a provision of the bond requiring notice of default to be given within 24 hours after the occurrence thereof. Where a building contract provided that changes in the plans should be agreed to before being made, and required that the amount, whether an increase or a decrease in cost, be indorsed on the contract, failure of the parties to sign agreed changes indorsed on the contract did not release the surety on the contractor's bond. Where a building contract made the agreed price of changes and extras a part of the cost to be added to the original price, the total so ascertained was controlling under a clause permitting the owner to retain a certain per cent. of the contract price until the completion of the building. Where a contractor's bond obligated the surety to protect the owner from loss, growing out of laborers' or materialmen's liens, the owner was entitled, in good faith, to discharge debts that might have been asserted as liens against the property. (Kentucky Court of Appeals.) Illinois Surety Company *vs.* Garrard Hotel Company, 118 S. 967.

RIGHT OF A BUILDING CONTRACTOR'S SURETY TO A DISCHARGE.

Where a building contractor broke his contract about August 1, a delay until August 22 in notifying the surety on his bond did not release the surety, the first lien being filed against the owner on October 8 following. An alleged secret understanding between the owners and the contractor that when he had completed the work they might want him to take a second mortgage for such sum as might be due him not being a contract, did not release the contractor's surety, especially where the contractor was delinquent when the favor would have been required and the entire price was in fact paid in cash. That the owners did not make a payment to the contractor when due did not release the surety, where it is not shown that a certificate therefor was ever presented, or that the want of payment was in any degree the cause of the default. (Washington Supreme Court.) Martin *vs.* Empire State Surety Company, 101 Pac. Rep. 876.

DAMAGES FOR DELAY IN COMPLETING BUILDING CONTRACT.

A contract required the building to be completed on or before a specified date, or that the contractor pay $120 a day as liquidated damages for any delay, and provided that if the work should be delayed from any of certain specfied causes the contractor might have an extension of time if a claim therefor was presented to the architect within 24 hours after the delay. Held that where the contractor made no application for an extension of time for delay caused by a change in the roof required by the owner such change did not waive the provision requiring completion on the date specified, nor relieve the contractor from liability therefor. Where the time limit in a building contract is waived by the act of the owner, the contractor is bound to complete the building, including any extra work required, within a reasonable time, unless otherwise stipulated. Where a party by his contract charges himself with an obligation possible to be performed, unforeseen difficulties, however great, will not excuse him, and he must perform unless performance is rendered impossible by act of God, the law, or the other party. (St. Louis Court of Appeals.) Ward *vs.* Haren, 119 S. W. Rep. 446.

DAMAGES NOT RECOVERABLE BY A CONTRACTOR FOR PERSONAL INJURY.

For several years before being injured in a railroad accident, plaintiff was a carpenter and building contractor, and took entire contracts, though sometimes he furnished labor only. At other times he furnished material only, and sometimes both labor and material. He had a horse and employed men. Held that his income before the accident must be regarded as uncertain business profits proceeding from invested capital, which could not be considered in ascertaining the loss caused by the injury. (New York Court of Appeals.) Gombert *vs.* New York Central & Hudson River Railroad Company, 88 N. W. Rep. 382.

Directions for Applying Metal Shingles.

Some very interesting information relating to the proper manner of laying metal shingles, together with directions for applying hip shingles, valley and ridge finish, is contained in a booklet recently issued by the Wheeling Corrugating Company, Wheeling, W. Va. The matter is of such a nature as to appeal to a large class of readers of *Carpentry and Building* and we present the following extracts herewith:

Metal shingles are applied by the same rules that govern the laying of wood shingles or slate: Cover building with sheathing boards laid tight joint; good common boards will answer, but must be of even thickness. Sheathing boards should be laid either parallel with the ridge and eaves or diagonally—never lay sheathing boards up and down.

The use of sheathing paper is recommended; being a nonconductor, it adds much to the warmth of the house in winter, makes the house cooler in hot weather, and adds but little to the cost of the roof. Never use tarred paper under metal roofing; the acid in the tar injures the metal.

Commence laying the shingles of the lower left hand corner, when facing the comb of the roof. Let the first course project over the eaves about 1 in. or more, using a chalk line to keep the courses straight at the bottom. The bottom of the shingles is the guide to lay a straight course—not the top.

At the end of the building let the shingles project about 1 in. over the bargeboards; turn sides down and nail. In laying the second and subsequent courses, every alternate course will start with a half shingle in order to break joints. Where cutting and fitting are necessary, the good judgment of the workman must be his guide. If there be a gutter formed near the eaves have the shingles rest upon it, as you would if using wood shingles or slate.

In flashing against a side wall bend the shingle so that is projects up to side of the wall 3 in. or more, and counterflash down to within 1 in. of the roof line. These directions apply to dormers, chimneys, skylights, &c.

In laying shingles toward the valley to make connections cut the shingles to the same angle as the valley, allowing them to project about ½ in. over the fold, and turn same under to form a hook, then with hand tongs or other tool lock the shingle to the flange of the valley. The fold in the valley allows for contraction and expansion.

In working from the valley it is best to lock three or four shingles together, place them in position on the roof with bottoms parallel with eaves, tack them at the top, then with a straight-edge mark and cut shingles to fit angle of the valley, allowing about ½ in. to bend under and lock on the flange of the valley; this is easily done with hand tongs or other tool.

Ridge finish, if used, must be put in place and nailed to the sheathing before the last course of shingles is laid at the top of the roof. Slide the tongue end of one piece of coping into the opposite end of the next piece to make a snug joint. Nail coping through the nailing flanges; do not nail through the folds. Insert the top of the last course of shingles into the folds of the ridge coping over the nailing flange, thus protecting the nail heads from the weather and making an absolutely weatherproof finish.

Hip shingles are applied over the main roof shingles after they are all laid and nailed in place. The roof shingles are laid clear to the hip, allowed to project and cut off 1 in. beyond the hip line. This projection is to be turned down over the hip and nailed.

The shingles on the other side of the roof are allowed to project about 1 in. back over the hip line and over the side already finished, turned down and nailed.

At the hip there is a double covering of shingles, both edges nailed. The hip shingles are then laid in place and nailed, starting from the bottom upward, overlapping each other enough to make a tight joint.

Any good carpenter or workman, who understands the simple rules for applying wood shingles or slate will have no trouble in laying metal shingles. No solder is used. Only a pair of snips and a hammer, the most ordinary of tools, are required.

New Publications.

The Architects' Directory and Specification Index for 1909. Size, 7¼ x 10¼ in.; 212 pages. Bound in red cloth covers. Published by William T. Comstock. Price, $3, postpaid.

This is the ninth edition of a work which is of special interest to those connected with the building industry, containing as it does a list of the architects of the United States, Canada, Cuba and Porto Rico, classified by States and towns. There is also a list of landscape and naval architects of the United States and Canada and a special list of architects to the Boards of Education, together with the names of architectural societies and organizations of the world. The latter is probably the first list of this character issued in convenient form for reference, and is therefore one that will be valuable to architects and the officers and members of American societies. Another interesting feature is a revised list of the officials of the Building Departments in the principal cities of the United States and Canada.

The specification index consists of a list of prominent dealers and manufacturers of building materials and appliances classified alphabetically and with the names under each heading similarly presented.

The work is considerably enlarged from the edition of a year ago, and not the least interesting feature are the announcements of leading concerns connected with the building industry. There is also a list of periodicals issued in the interests of architecture and building, together with a list of the leading architectural schools throughout the country.

Dictionary of Architectural and Building Terms.— One hundred and four pages. Size, 5 x 7½ in. Profusely illustrated. Bound in board covers. Published by the Industrial Book Company, Price, postpaid, 50 cents.

This work, compiled from the best authorities, is intended for the use of the young student of architecture and building construction, who has need of a small dictionary of the various terms used in its literature. Owing to the size of the book, no claim is made of completeness, for to have made it larger would have defeated the main object, which was an architectural dictionary at a moderate price.

In the prefatory remarks the various publications which were consulted and drawn upon for the information presented are enumerated.

The terms are arranged in alphabetical order and are printed in heavy bold face type, while the definitions are in smaller letters, thus forming a striking contrast and facilitating easy reference.

Asphalts, Their Sources and Utilization.—By T. Hugh Boorman. 176 pages. Size, 7 x 10 in. Bound in heavy board covers. Published by William T. Comstock. Price, $3.

The great advance in the asphalt industry has called for a complete manual on the subject, and this the author has endeavored in the present work to furnish, so that architects, engineers and students in the technical schools, as well as municipal officers having charge of road construction, may have a reliable reference book on the topic indicated. The author first treats of asphalt in its reference to pavements for side streets and goes somewhat at length into its application to country roads, so as to secure a good country road bed free from both dust and mud. He does not, however, content himself with treating with these two main uses of the material, but refers to its employment in connection with waterproofing, roofing, the manufactures and the industries. The book is profusely illustrated with, for the most part, half-tone engravings showing work in connection with which asphalt plays an important part.

Tacoma's New Skyscraper.

The city's largest building permit of the year, issued early in September by Building Inspector Hebblethwaite of Tacoma, Wash., covered the construction of a 16-story office building, which is now under way, at Pacific avenue and Twelfth street, and will cost in the neighborhood of $375,000. When completed the National Realty Building, as it will be called, will be the tallest skyscraper north of San Francisco, and its erection will mark a new era in Tacoma. The frame will be entirely of steel, hot riveted together in the usual way, and the columns, beams and girders will be incased with fireproof material. The floors and walls will be of reinforced concrete, the idea being to make the construction first-class throughout and in accordance with insurance rules. It is expected to have the concrete foundations for the steel work ready by November 1. According to Architects Heath & Twitchell, the design of the Pacific avenue front will be French Renaissance of the year 1650, a style peculiarly adapted to tower effects. The material will be richly modeled terra cotta and Roman style brick. Over the entrance on the avenue will be groups of statuary symbolic of the industries of Puget Sound, the groups being of full size figures, representing agriculture, mining, manufacturing and transportation. At the fourteenth floor level will be a balcony in intricate design of terra cotta tracery, above which are to be groups of dormers, the whole front having a magnificent tower effect. The roof of the tower will be 226 ft. above the street level and will be surmounted by a flagpole 57 ft. high.

The first floor will be occupied by stores, above which the floors will be divided into 367 offices. There will be four high speed elevators inclosed in brass grille work and polished wired glass. The stairway will also be inclosed in metal frames filled with wired glass, and the various floors will be accessible only through doors. The elevator shafts will also be inclosed.

Government Record of Wholesale Lumber Prices.

A record of the wholesale prices of lumber, f.o.b. mill, for the quarter including April, May and June last, based on reports submitted by more than 2000 of the largest manufacturers of lumber in all parts of the country, has been issued by the United States Forest Service. Requests for data for the second quarter, ending September 30, will be sent out in several weeks and will be published in the early part of October.

The record covers the principal items of all the commercial woods cut in nearly every State. The compilation was undertaken for the double purpose of having a continuous statistical record of such prices and to show, in contrast to market prices, which include the important items of freight charges and selling costs, just what the manufacturers of lumber receive for their product at the mill.

For more than a year a monthly record has been compiled, showing the prices of lumber in 18 of the largest markets of the country. The market prices published do not show what the lumber is worth at the mill, as the freight charges, selling costs and other items were included; but the quarterly record eliminates these items and shows the mill price. Only a few representative grades in each of the hardwoods and softwoods were taken, but from them lumbermen can draw deductions so as to give the approximate values of grades on which prices were not requested. In addition to the numerous items on which prices were secured, the value of the mill run—the average of all grades of lumber produced—was also obtained for all the commercial woods.

Drawing Classes at the Mechanics' Institute.

The school year of the Mechanics' Institute, which is conducted by the General Society of Mechanics and Tradesmen of New York City, at their building, 20 West Forty-fourth street, begins on Monday, September 27, and continues to about the middle of April, 1910. Instruction in this institute is under the directorship of Louis Rouillion, who is assisted by some 29 competent instructors in charge of the various courses. Thirty-eight separate subjects are taught, which include architectural, mechanical and freehand drawing; clay modeling, mathematics, physics and electricity. Classes are in session two evenings a week, from 7.30 to 9.30 p.m.

The tuition is free and affords an excellent opportunity for young men who are employed in ordinary working hours of the day and who wish to advance themselves in the theory and knowledge of the various trades in which they are employed, the only expense to the student being the purchase of instruments, paper, &c. Three years are required for the completion of any one of the courses, when, if all the conditions have been complied with, the diploma of the society will be awarded.

Application cards for admission can be had by applying at the institute, which, when properly filled out, are placed on file in the order of receipt, and this constitutes a waiting list.

Our readers will be interested to know that the class in sheet metal drafting will, as in former years, be under the instruction of George W. Kittredge, well known as a valued contributor on various topics to the columns of this journal.

A Book on Oak Flooring.

A very interesting little work bearing the title, "Oak Flooring," and in which is outlined the correct methods of manufacturing, handling, laying and finishing oak flooring, with a synopsis of widths, lengths and grades, has been written and published by Henry H. Gibson, editor of *Hardwood Record*. The volume consists of 40 pages, with numerous half-tone engravings made from photographs and drawings, the printing being on heavy India tint enameled paper, in sepia ink, with orange ornamentation.

Within its covers are chapters on hardwood flooring; on the different varieties of oaks, with a description of the botany, range of growth and characteristics of the principal types; the manufacture of oak lumber and flooring; standard grades and sizes; how the flooring material should be handled and housed; how it should be laid and nailed, scraped and finished, and how thin flooring can be utilized for a covering for old flooring. Reference is also made to the uses of different grades and how to care for oak floors, &c.

We understand that the book has been approved by the leading oak flooring manufacturers of the United States, who contend that the general distribution of it to architects, builders and house owners will add materially to the sum of knowledge necessary for the correct handling, finishing and care of oak floors. These manufacturers have purchased outright 10,000 copies of the publication, which they have authorized Mr. Gibson to distribute to any one interested, and until the edition is exhausted copies can be obtained by addressing Book Department, *Hardwood Record*, Chicago, Ill., and inclosing five 2-cent stamps.

Permanent Exhibition of Building Materials and Appliances.

A short time since we referred to the opening of the Permanent Exhibition of High Grade Building Materials and Appliances as conducted by the Building Trades Employers' Association in the Builders' Exchange, 30 to 34 West Thirty-third street, New York City, and now we have before us a list in pamphlet form of the exhibits. In the arrangement of the matter the names of the materials and appliances exhibited are given in alphabetical order, and under each heading appear the names and addresses of the exhibitors. The point is made that every method is being employed to make the exhibition interesting, attractive and educational, and the increasing number of architects, builders and prospective buyers who daily visit it is evidence of its success and of the value of the exhibition to them.

The manager of the Exhibition Department is James J. Conor, to whom much credit must be given for the success which the exhibition has attained. It may not be without interest to state that the exhibition is free to the public.

Lessons in Architectural Drawing.

The class in architectural drawing in the night school at the Twenty-third Street Branch of the Young Men's Christian Association, Manhattan, N. Y., will meet on Monday and Thursday evenings from 7.30 to 9.45, from October 1 of the present year to May 21, 1910. The work is intended to help young draftsmen and beginners in the study of architecture, and the class will be conducted by Eli Benedict, architect, as heretofore.

CONTENTS.

Carpentry and Building

NEW YORK, NOVEMBER, 1909.

A Bungalow of Cement Plaster and Shingled Exterior

(With Supplement Plate.)

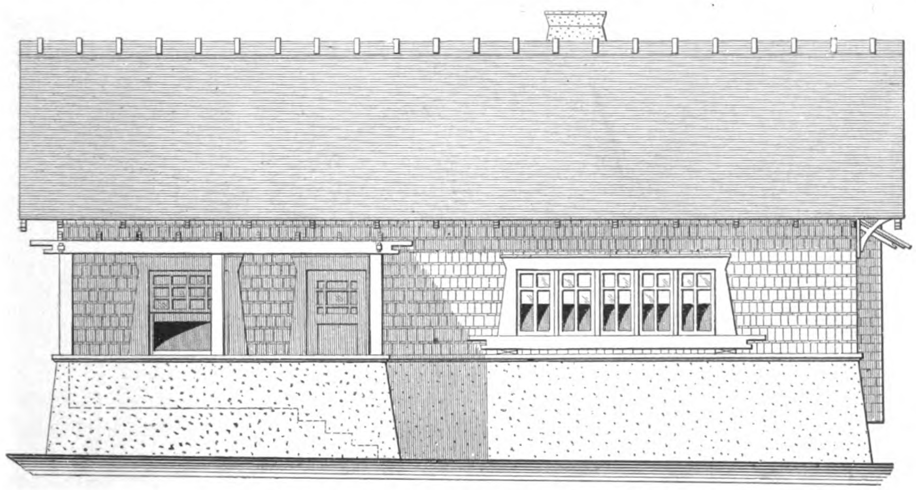
ANOTHER of the designs submitted in our recent Bungalow Competition and in the opinion of the committee having charge of the matter possessing such merit as to entitle it to "Honorable Mention" is presented herewith. In this design there has been an attempt on the part of the author to express in simple, vigorous lines the individualty of the owner, and an inspection of the plan will show that the little home abounds in practical details which are at once a pleasure and an inspiration to the housewife.

The group of half-tone illustrations which constitute the basis of our supplemental plate give an excellent suggestion of the external appearance of the bungalow with its wooded surroundings, as well as of the finish of some of the principal rooms on the ground floor. The upper left hand picture is a view of the built-in buffet in the dining nook as seen from the living room. The picture immediately below this shows the seat and bookcase just at the left of the fireplace, while the interior view at the right center of the supplement plate is the piano nook as seen by one standing just at the edge of the fireplace hearth.

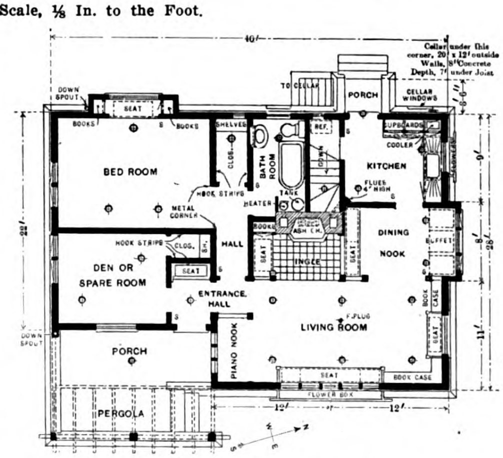
As the quaint door with its old-fashioned iron knocker is opened, giving entrance to the vestibule, the eye of the visitor is momentarily arrested by the greeting of the house, which appears above the spacious seat amid the coat pegs, "'Tis luck to me to welcome ye." Within the living room a quiet dignity is expressed in the color and treatment of the interior, in the walls, fireplace and furnishings, while the dining nook, with its spacious built-in buffet, and the kitchen beyond replete in lockers, drawers, pantry, cupboards and even the indispensable "California cooler," are suggestive of much comfort and convenience.

According to the specifications of the architect the base course of the bungalow consists of cement plaster of a deep rich brown tone and "dash" finish applied on metal lath. This course extends to the sills of the windows, the mortar being composed of one part Portland cement and two and one-half parts clean sharp sand. Between the sill course and eaves on the front and back and the beams on the ends, the outside surfaces of the walls are covered with Oregon cedar shingles laid in alternate courses of 1 in .and 7 in. to the weather. The gable ends are plastered with the same mixture, toned to a lighter brown than the base or batter course. In designing the bungalow the idea was to carry the impression of the building growing gradually out of the ground and thus avoid that startling effect which a straight white wall is apt to produce when it springs directly from the earth. To this end a batter of 1½ in. to the foot was used on the base course and on all exterior window and door casings.

The 6 x 6 in. oak posts which support the girders and plates rest on 12 x 24 x 24 in. concrete footings, and when in position a foot of concrete was poured around them. Plates, girders and joists are made of 2 x 8 in. yellow pine, the joists being laid 16 in. on centers. The studding are 2 x 4 in., also placed 16 in. on centers, while



Front, or East, Elevation.—Scale, ⅛ In. to the Foot.



Main Floor.—Scale, 1-16 In. to the Foot.

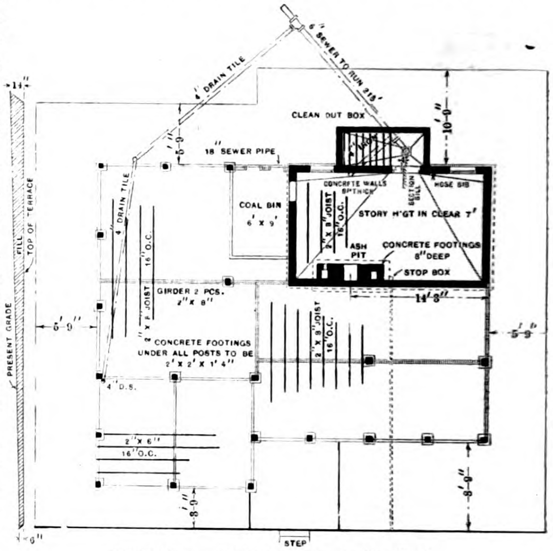
A Bungalow of Cement Plaster and Shingled Exterior.—Architect, Stanley H. Moore, St. Louis, Mo.

the plates are 4 x 4 in. and the rafters 2 x 6 in. placed 24 in. on centers. The entire building is sheathed with ⅞-in. yellow pine, over which is placed a layer of building paper. The roof is covered with clear Oregon cedar shingles exposed 5 in. to the weather. The barges or verge boards are 3 x 8 in., supported on brackets built of 6 x 6 in. material. That portion of the roof which projects beyond the building is covered on the under side with ⅞-in. yellow pine tongued and grooved fencing flooring.

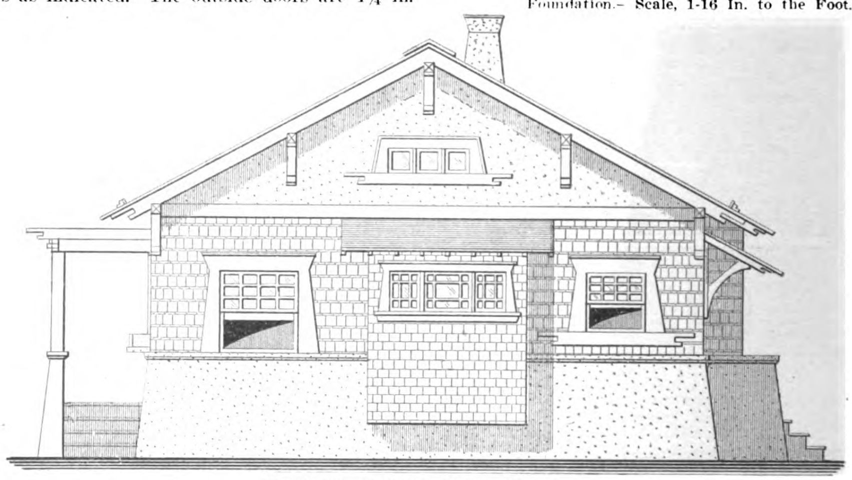
The pergola and porch posts are solid 8 x 8 in. rough timbers, while the beams are 4 x 8 in. rough yellow pine. The studs at all corners and angles of the frame are doubled, and all doors and windows have double headers. The joists are doubled under all partitions and thoroughly cross bridged. All exterior trim except where otherwise specified is of cypress. All doors have rabbeted frames. The porch floors are of 1⅛ x 3 in. tongued and grooved fir laid with white lead joints and blind nailed to every joist. The ceiling of the porches is of ⅞ x 4 in. clear matched yellow pine. The flooring around the chimney and window casings is of Taylor's I. C. "Old Style" tin.

All interior finish is of selected yellow pine hand smoothed and sandpapered. The solid 6 x 6 in. posts and girders and the 3 x 6 in. beams, which are a feature of the living room and nooks, are of the same material. All inside doors are of 1⅜ in. yellow pine and have stiles and panels as indicated. The outside doors are 1¾ in.

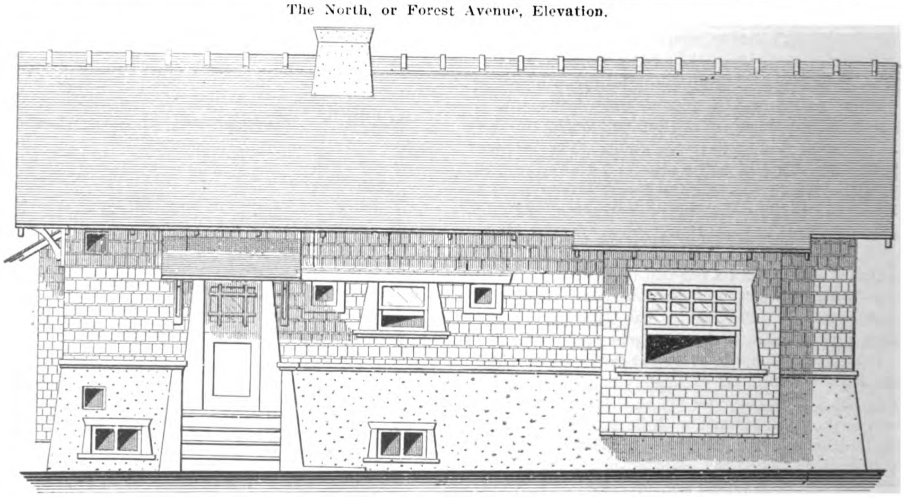
The inside trim is indicated in part in the details, the wainscoting of the living room and nooks being of ⅞ x



Foundation.– Scale, 1-16 In. to the Foot.



The North, or Forest Avenue, Elevation.



The West, or Rear, Elevation.

A Bungalow of Cement Plaster and Shingled Exterior.—Elevations.—Scale, ⅛ In. to the Foot.

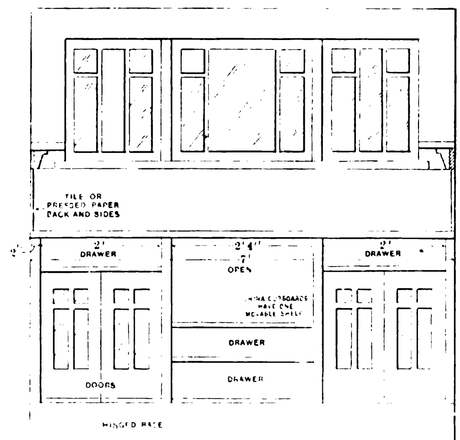
thick, that in the kitchen being a double hung specially designed Dutch door.

12 in. boards, with the joints covered with ½ x 3 in. battens each nailed with ten 1¼-in. copper trunk nails.

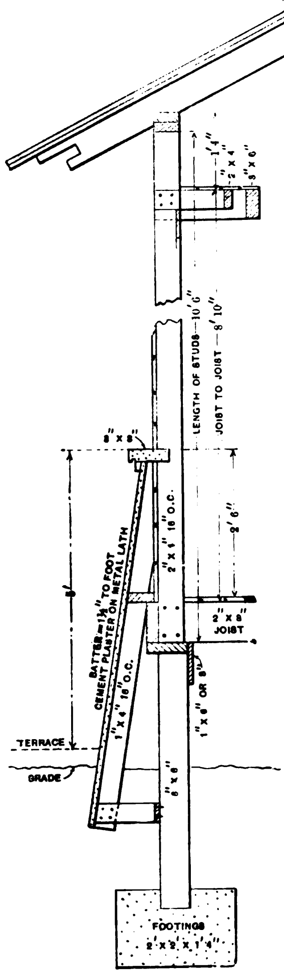
The wainscoting of the dining nook has a plate rail supported on brackets. The floors are of ⅞ x 3¼ in. quartered yellow pine. The seats throughout the various rooms are built of ⅞-in. material paneled, with 1⅛ in. top frames, ⅞ in. battened tops, sunken hinges and lifts. The ends of the seats are of ⅞-in. material with posts and panels as shown.

The bookcases throughout are lined with ⅝ x 3¼ in. tongued and grooved yellow pine ceiling, and are fitted with ⅞-in. shelves and glass doors, the latter being made of a single piece battened with a ⅞-in. angle iron. The down enameled flushing box and nickel trimmings. All pipes and open plumbing are nickel plated. The water pipes connecting with the main service pipes are ¾ in. with ½ in. branches to lavatory and toilet. The other runs are ¾ in.

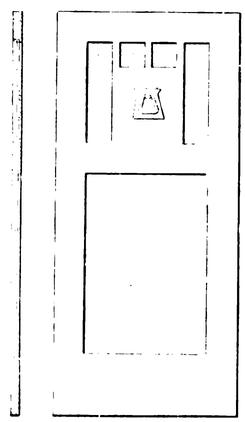
The bungalow is piped for fuel gas and for one light in the kitchen. The electric wiring is done in compliance with the latest rules of the National Board of Fire Underwriters, the fixtures consisting almost wholly of copper lanterns and dome, embodying the same *motif* as occurs in the details in the room in which they are hung. All lights are controlled by switches and the various circuits are run from the space over the refrigerator in the cellar



Elevation of Buffet in Dining Nook.—Scale, ⅜ In. to the Foot.



Typical Section Through Side Wall, Showing Construction.—Scale, ⅜ In. to the Foot.



Section and Elevation of Front Door.—Scale, ⅜ In. to the Foot.

Elevation of Bookcase and Seat at North End of Living Room.—Scale, ⅜ In. to the Foot.

A Bungalow of Cement Plaster and Shingled Exterior.—Miscellaneous Constructive Details.

medicine cabinet in the bathroom has a 1⅛-in. door with a 17 x 24 in. bevel plate mirror.

The built-in buffet in the dining room is provided with doors of the same construction, employing the same *motif* as that of the bookcases in the living room. The buffet has a glued 1⅜ in. top, drawers, and is lined above the top, below the casement windows, with dull brown-green tile. The California cooler or cooling closet is built with exterior top and bottom doors and fitted with movable wire shelves.

In the kitchen is an 18 x 30 in. cast iron enameled sink. The bathroom is equipped with a hot water boiler and gas heater, a 5½ ft. porcelain enameled steel bathtub with 3-in. roll, supplied with Fuller combination cocks, an oval porcelain enameled lavatory hung on brackets with nickel plated trimmings, supply, waste and trap, and a double acting siphon jet porcelain closet with low entrance at which point are placed the meter switches and flushing plug. The hardware throughout the building is of plain Bower-Barff finish.

The walls, ceilings and partitions inside are plastered with two coats of Acme plaster, the first being a brown coat and the second a sand finish coat, the latter floated to a smooth fine surface. The bathroom and kitchen are wainscoted to a hight of 4 ft. 6 in. with a smooth white Keene cement laid off in blocks to represent tile.

All interior woodwork, including the floors, is stained with one coat of Chicago Varnish Company's oil stain and finished in accordance with its specifications. The wainscoting and woodwork of the bathroom has three coats of egg shell enamel, the floors are treated with one coat of Johnson's floor wax, well rubbed in. All plastered walls are tinted with delicate shades of Calcino. The shingles on the exterior walls were dipped in Berry

Brothers shingle tint, No. 40, as were also the rafter ends and the timbers of the porch and pergola. All exterior trim, porch floors and doors received three coats of pure linseed oil and white lead.

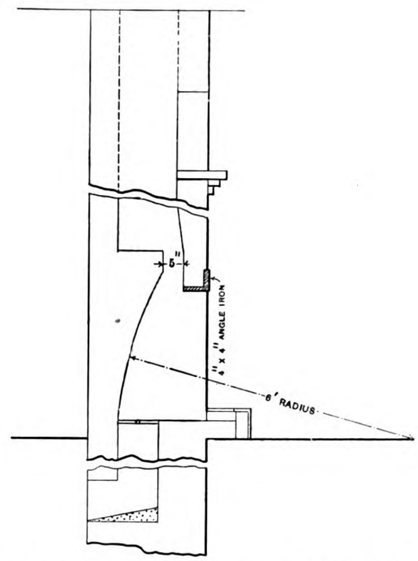
The bungalow is heated by a 48-in. steel hot air furnace supplied with floor registers and hot water connections to the boiler. The furnace stands in one end of the cellar which is 12 x 20 ft. in area and 7 ft. in the clear. The basement walls are of 8 in. concrete, with a cinder concrete floor, which latter drains to a trap in the areaway. The basement is also fitted with hot and cold water connections for laundry work.

The attic, which is reached by means of a built-in ladder, is finished with ⅞ in. yellow pine flooring. It can easily be converted into three rooms with ceilings 7 ft. 6 in. in the clear, if so desired.

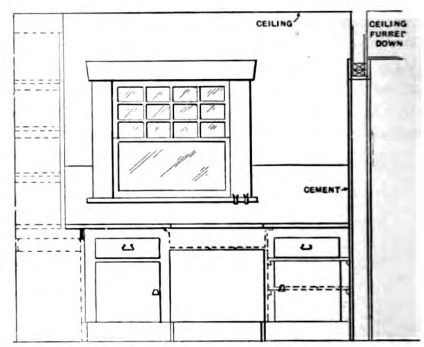
The fireplace and hearth in the living room are built of manganese brick with butted dry vertical joints, the ½ in. horizontal joints being raked out to a depth of ½ in. and laid in mortar the color of the face of the brick.

In this connection it may be interesting to mention the cost of some of the more important parts of the work of construction, such as excavating and grading, $34; brick masonry, $75; concrete, $115; millwork, $300; all classes of lumber, $440; plumbing, $250; exterior plaster work, $75; interior plaster, $140; heating, $110; electric wiring, $60; sheet metal work, $37; hardware, $49; interior decorating, $57, and carpentry work, $424.

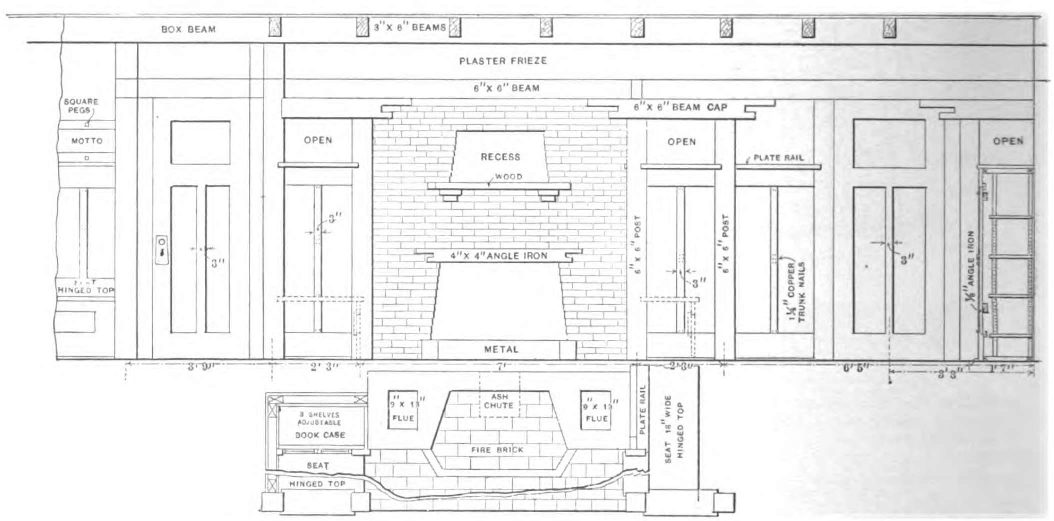
The bungalow here illustrated was built for M. Katherine Moore, at Selma and Forest avenues, in Webster Groves, a suburb of St. Louis, Mo., in accordance with plans prepared by Stanley H. Moore of the city named. The contract was executed by Alfred H. Annan, also of Webster Groves, Mo.



Section Through Fireplace.—Scale, ⅜ In. to the Foot.



Detail of Kitchen Pantry and Sink.—Scale, ¼ In. to the Foot.



Elevation and Plan of Fireplace with View in Living Room Looking Toward the West, or Rear, and Showing Hall Door to the Left and Dining Nook to the Right.—Scale, ¼ In. to the Foot.

A Bungalow of Cement Plaster and Shingled Exterior.—Miscellaneous Constructive Details.

MANY visitors to the city who have witnessed the brilliant appearance at night of the tower of the Singer Building on Broadway have doubtless wondered how the effects were produced, for as far as they could see, no electric lights were visible to the naked eye, whether the tower be viewed from the streets of the city or from a steamer in the harbor. The secret of the beautiful illumination is found in 31 search lights with 18-in. lenses which play upon the walls of the tower from the roof of the main building, without being seen themselves but making the tower stand out as a column at night. Fifteen hundred 16-candle power incandescent lamps with reflectors are disposed about the tower to "even up" the illumination, as the beauty of the whole scheme depends upon the uniformity of the distribution of the light rays.

MAKING AND CASTING PLASTER CENTERPIECES.

By William Gregory.

FIBROUS plaster, or "staff," as it is commonly called, is a very important branch of the plasterer's art, and for decorative purposes lends itself better than any other material, as its sharp lines, bold and deep relief, lightness and elasticity make it preferable to *papier mache* or stamped metal, which, owing to flatness and want of relief, are comparatively little used for decorative purposes, although they are well adapted for stores, lofts and such places that require hard usage. Staff can also be cast and fixed in larger sections, while its fire resisting qualities are better than some other materials.

For interior decorative purposes it is admirably adopted, as old ceilings, whether plain or enriched, can be re-covered with ornamental plaster slabs without disturbing any of the old plaster, thus doing away with the attending dirt and dampness as in the case of the old-fashioned "solid" plaster.

not to cut away too much stuff, though the plasterer has one great advantage over the stone or wood carvers, since he can always remedy any little defect or overcutting by adding a little gauged plaster.

Should it be intended to model one of each of these flutes and to then make molds from which the rest can be cast the bed would be made by cutting the running mold straight, as shown by the dotted line in Fig. 4, which would thus leave a plain flat surface onto which the flutes would be planted. Having carried two of the lines shown at *a*, *b*, *c*, *d* on to the bed, one of the flutes would be modeled in clay within these lines, or it could be worked by hand with a little gauged plaster.

The mold for running in one operation the whole of the flower with the exception of the four *pateræ* is shown in Fig. 4 of the illustrations. However, in making an original from which to produce casting molds it will be easier and better to cut the mold into three parts marked

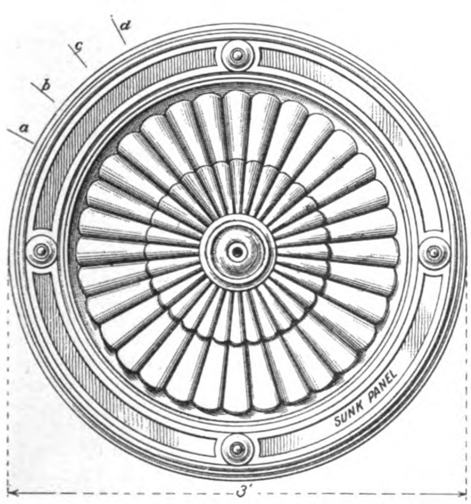


Fig. 1.—Simple Design for Centerpiece.

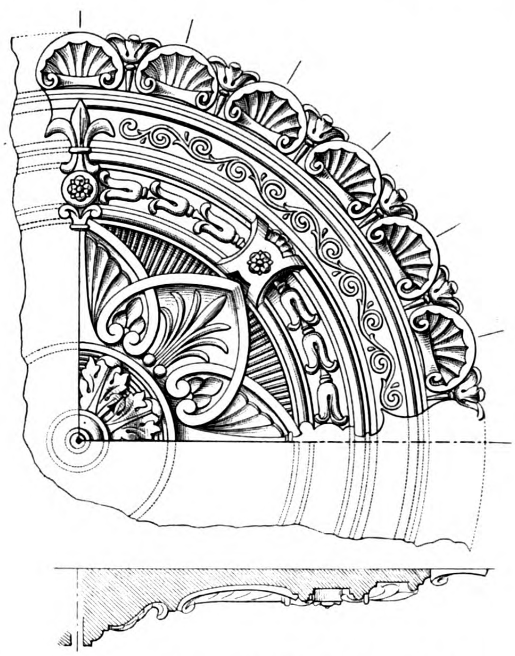


Fig. 2.—Partial Plan and Horizontal Section of a More Complicated Design.

Making and Casting Plaster Centerpieces.

A new centerpiece can be fixed to an old ceiling by screwing on and through the old plaster, while old plain cornices can be covered with more elaborate ones, false beam ceilings of any design can be fixed on a plain ceiling or old beams can be cased with more ornamental ones, &c. Numerous other uses might be mentioned, but these will be dealt with in future issues.

In the illustrations presented herewith, Figs. 1, 2 and 3 represent designs for centerpieces, Fig. 1 being a very simple affair, and easily made, as every part is produced with running molds, there being no modeling of any kind required. The center or body portion, which consists of two rows of diminished quarter rounds or flutes, will require a little carving. Should it not be desirous to carve them, one of each row can be modeled and molds made from these, while the rest can be cast and planted on the body, care being taken in cutting the zinc for the running mold to allow for its bed. If it is intended to carve the flutes in position the circumference will be spaced or divided into a given number of equal parts as shown at *a*, *b*, *c*, *d*, in Fig. 1. Care must be taken in the carving

"rim," "body" and "seed," and run it in three operations, making separate running molds for each part. After this has been done they can be fixed together.

The rim or outside can be run first and left on the bench, after which the body may be run on any other part of the bench, and if the molds have been correctly cut it can be lifted and fitted right into the rim. The seed or center portions is next run and fixed into position. By running it in three separate parts the plaster is less liable to swell or warp in the setting.

The *patera* will be the next to be run, a profile view of it being shown in Fig. 5. The best way to run this is to place a small piece of gauged plaster on the bench, trim to the required hight and into which a small wire nail with the head filed off is inserted and onto which the running mold will fit, as shown at P in Fig. 6. Being only 2½ in. in diameter and ½ in. thick, care will be required in making and running such a small mold. Should it not be desirous to run the four *pateræ*, one can be run and cleaned up and a mold made from it, while the other three are cast and planted into position, as shown in

Fig. 1, the return stiles on each side of the *pateræ* being worked by hand, thus completing a sunken panel between each two *pateræ*. Having placed the several parts together, point up and clean everything sharp and true.

The completed centerpiece is then prepared for molding by giving it a coat of shellac, which is prepared in the following manner: Take a wide mouthed bottle and fill it rather more than one-third full of pure orange shellac, then fill up the bottle with pure wood alcohol and stand it in a warm place to dissolve. The dissolving will be hastened by frequent shakings.

It is much better to give two coats with thin shellac rather than one thick coat, for if the shellac is too thick it will peel off, thus giving bad results in casting. The bottle of shellac must be tightly corked when not in use, in order to prevent evaporation. The wide mouth of the bottle will allow the handle of the brush to be inserted through the cork, thus keeping the brush soft and always ready for use.

Having coated the centerpiece carefully with shellac it is now ready for wax molding. It may not be without interest to state that molding wax consists of pure beeswax, resin and tallow, and that a good molding wax is made from 2 lb. of pure beeswax, 1 lb. of resin and 1 oz. of pure tallow, although the quantity of resin should be varied according to the quality of the wax. A good wax will carry more resin than a poor one. The wax and resin should be melted over a very slow fire in a pot similar to a carpenter's glue pot, the inner pot having a lip in order to better pour the wax. Care must be taken that it does not boil or burn, as boiling destroys its virtue and makes it very brittle as well as very liable to crack and break when used in casting.

Making the Wax Mold.

To make the wax mold a fence must be placed around the ornament and about 1 in. from the edge. This fence can be made by placing strips of common clay around about 1 in. higher than the highest point, which in this case will be the center seed. A long strip of sheet lead or zinc can be used more expeditiously and can also be repeatedly used, since clay with repeated use becomes filled with dirt and bits of plaster, rendering it unsatisfactory to handle. Whichever is used care must be taken to back up the fence with clay or gauged plaster in order to prevent the wax from escaping.

Having everything in order give the whole a thin coat of stearine or linseed oil, but if clay has been used in making the fence no oil must be used on the clay, as this will spoil it for future use.

In pouring the wax always pour into the deepest part —in this case the rim next to the fence—and allow the wax to flow upward toward the highest point and so exclude the air, thus preventing air holes from appearing on the face of the mold. If it should be necessary to economize in the use of wax the mold can be "bled"; that is, when the wax has commenced to get firm on the thin places the fence can be cut to allow the wax that is still soft to run off and into the wax pail. This process will save a great amount of wax and allow more freedom in easing the molds from the casts afterwards made in the mold. After the excess of wax has been allowed to run off leaving a thin coat of ¼ in. or so, the surface is washed over with clay water or strong soapy water and the fence filled up again with gauged plaster, after which it is ruled off straight on the back to a level with the top edge of the fence. This will allow the mold to rest level on the bench when castings are made from it.

Some centerpieces are cast without any stiffening in them, but it is here intended to use burlap and stiffening lath. Before commencing to gauge the plaster it will be well to see that everything is in readiness. Have the burlap cut to the required size, which should be about 3 in. larger all around than the outside edge of the flower. Several narrow strips should be cut and placed conveniently at hand. It is always well to have a few extra pieces of each sort for use in case of accident. The stiffening lath should be placed near to and in the deepest parts of the outside rim. Several other lath should radiate from the center also but butt against the rim lath in order to make the pieces more rigid. Four or six of these radiating lath should be sufficient, as too many would serve no good purpose and would only tend to make the ornament heavy. In cutting these lath care should be taken that they fit with ease, allowing ½ in. or so between each two lath, the space to be filled up with plaster, though if the depth will allow it overlapping the joints with other lath or an extra piece of burlap will tend to strengthen the work.

Having oiled the mold and got everything ready at hand, gauge sufficient plaster in a clean pail and give the mold a thin coat of about ⅛ in. all over. This is best done with a long haired brush similar to those used by painters, although longer in the hair. It is best to lift the plaster out of the pail with the brush and shake it over the mold, then give it a very light brush so as not to destroy the face. Take the largest piece of burlap and first spread it on to the plaster, then spread it well but lightly with the hands, working it from the center to the outside edge and taking care not to press the burlap through the plaster, else it will show through on the finished piece. Brush a little more plaster over the burlap, then take the rim and radiating lath and give them a coat of plaster with the brush. Place them in position in the deep parts, allowing no parts to overlap or it may make the back too thick and thus cause it to set unevenly on the ceiling. Turn the edges of the burlap over on to the lath and brush it well with plaster. Brush the strips of burlap over the radiating lath, using plenty of soft plaster, though no more than is necessary to fill the meshes of the burlap. Any surplus plaster may be placed around the edges and ruled off with a straight edge passed over the top edge of the mold. This will allow the centerpiece to fit the ceiling correctly when fixing. The whole work will have to be done quickly, as no size will be used in so small a job, although in larger work glue size will have to be used to prevent the plaster from setting too quickly. When the plaster has set, which will take only a few minutes, the whole is turned over, allowing the cast to lie flat on the bench.

In removing the newly made cast from the mold the plaster case is first taken off and the wax mold and cast are placed in a hot water bath for a few minutes in order to warm the wax and allow it to become pliable. When it is again placed on the bench with the cast down, ease the rim of the mold a little and gently lift it off, leaving the cast on the bench and placing the wax mold into its plaster case. This being the first cast taken out of the mold, it will be somewhat discolored on the face with oil, which can be removed by gently washing the face with hot water. Centerpieces as well as all other flat casts should be left on the bench until they are dry, for if placed on their edges or hung up they are liable to warp or twist.

Design of Elaborate Character.

The design shown in Fig. 2 is of a somewhat elaborate character and consists of four quarters, or, as they are generally termed, "plates," and as each plate is like its neighbor it is only necessary to model one and from it make the casting mold. From this mold any number of plates may be cast. A running mold will have to be constructed in order to run a portion of the body on to which the ornament will be modeled. As various parts of the ornament are repeated it is only necessary to model one of each ornament. From these molds are made and sufficient pieces cast to complete the entire plate. This quarter mold is employed in order to allow of large centers being molded, cast and fixed more easily than would be the case if they were cast in one piece.

A still more elaborate design and one which calls for a little more work than the two preceding ones, it shown in Fig. 3 of the illustrations. The outer portion of the body is composed of six plates, and as they are repetitions it is only necessary to model one and from this make a mold to cast sufficient plates to complete the entire design. The border also repeats itself, so that only one leaf need be modeled, and from this a mold prepared from which to cast sufficient leaves to complete the entire border. These borders if large are sometimes cast separately and planted in position after the rest of the flower is fixed. The center of the body is composed of four plates, and as the ornament is different in two of the four plates, two models are required from which to make molds to cast the other plates to complete the whole.

The spandrels being all alike, only one will be modeled and a mold made from it. The rest can be cast and planted in position.

Having cast sufficient number of pieces of all the different parts and planted them in position on the bench the whole is pointed and cleaned up. After giving it two coats of shellac and oiling every part, it is ready for making the wax molds, and the same methods as were employed in connection with the other flowers can be used in this one.

A few of the modeling tools which the modeler sometimes makes himself from pieces of boxwood, but which can be bought at stores where artists' materials are kept in stock, are illustrated in Fig. 7.

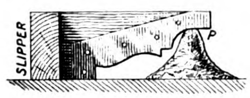


Fig. 6.—Running the Patera.


Fig. 3.—A Fancy Centerpiece.

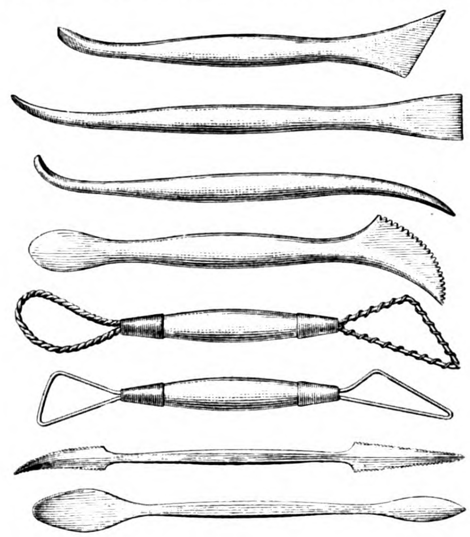


Fig. 7.—A Few Modeling Tools.

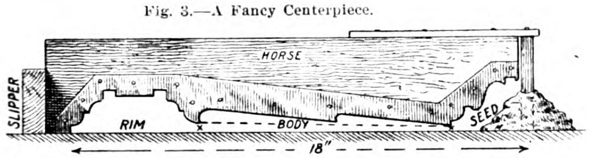


Fig. 4.—The Running Mold for One of the Flowers—Double the Scale of Fig. 1.

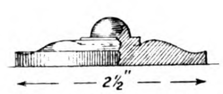


Fig. 5.—Profile of Patera.

Making and Casting Centerpieces.

Cleveland Builders' Exchange Honors a Japanese Builder.

Members of the Builders' Exchange of Cleveland to the number of about 200, assembled in the Exchange rooms on Monday, October 4th, and paid a tribute of respect to Japan and the Japanese. The occasion was a noon-day luncheon arranged in honor of Mr. Rinnosuke Hara, a contractor and builder of Tokyo, traveling through the United States as a member of the Honorary Trade Commissioners, representing the land of the Mikado. Mr. Hara was accompanied by Mr. I. Tanabe, an architect of Tokyo, and Mr. Z. Horikoshi, a prominent silk merchant, who acted as his interpreter. The Exchange rooms were decorated with American flags intermingled with the flag of Japan, and neat favors were provided for the guests and the exchange directors.

After luncheon, President McMillan welcomed the visitors on behalf of the building interests of the city and asked former President Hunt to conduct the program of speaking, Mr. Hunt having visited Japan and being well acquainted with the customs of that country. Mr. Hunt spoke in high praise of the Japanese and related a number of interesting incidents of his visits to that country. He then presented Mr. Hara, who addressed the exchange for about fifteen minutes in his native tongue to the great delight of his hearers. His remarks were interpreted by Mr. Horikoshi, who also spoke briefly on his own account. Mr. Tanabe then responded with a brief speech in Japanese which was also made clear to the members by the interpreter.

Following the speaking, former President H. C. Bradley offered a motion suspending the rules of the exchange and electing Mr. Hara an honorary life member in recognition of the building interests of his native country. This motion was carried by unanimous vote and President McMillan formally presented to Mr. Hara an elaborate certificate of membership, the work of preparing which was done by a young Japanese art student of the city. Mr. Hara responded to the compliment in a neat manner, and all three of the visitors were then presented with souvenirs illustrating the prominent buildings of the city. Before adjourning, the entire company arose and gave three cheers for Japan and its enterprising builders. There was a period of hand-shaking at the conclusion of which a group picture with the Japanese as a central feature, was taken on the front steps of the Chamber of Commerce Building. A special committee then conducted the visitors on a tour of inspection to new building operations, the Japanese manifesting great interest in the methods employed in construction work in this country.

THE COST OF BRICK LAYING for the sewers of Boston, using day labor, ranged from $9.04 to $18.34 per thousand, according to a report of Metcalf & Eddy to the Finance Commission. The number of bricks laid per hour per person varied from 13 to 242. The high cost for the city work is attributed to the lack of sufficient work to keep the masons busy.

WOODEN FLOORS FOR FACTORIES.

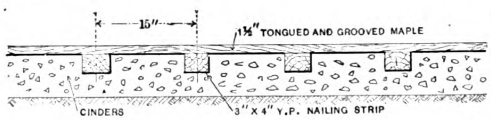
BY PAUL T. LESHER.

THE best foundation for a wooden floor is undoubtedly coal tar or asphalt concrete. When Portland cement is used the planking will decay unless the top of the concrete is spread with coal tar or asphalt. Floors over an air space are subject to dry rot. Asphalt or coal tar concrete is softened by oil, and the dust will wear machinery unless the concrete is covered by a plank flooring.

Double flooring at right angles can be laid on the above foundations without the use of sleepers. It is preferable to secure nailing strips to stakes 4 ft. apart each way and driven to grade, then concrete flush to the top of the strips and lay 1½-in. flooring.

A good practical floor can be constructed as shown in Fig. 1 of the accompanying sketches. Excavate the soil to about 12 in. deep and fill with cinders, tamping the latter thoroughly and then nailing the flooring boards to 3 x 4 in. nailing strips bedded in the cinders.

Floors constructed as shown in Figs. 2 and 3 are very strong and serviceable. Maple flooring makes the best wearing surface for floors, while cedar blocks form a neat, clean and durable floor which if laid on planks or gravel foundations costs from 8 to 11 cents per square foot. With regard to upper floors, it may be stated that when steel beams are used to support a floor the latter is generally made by placing 2 x 6 or 2 x 8 in. planks on edge and spiking them together, the wearing surface being made of hardwood boards.



Wooden Floors for Factories.—Fig. 1.—Floor Secured to Nailing Strips Bedded in Cinders.

A standard floor generally used for factories is constructed of heavy timbers and calls for a layer of spruce planking generally 3 in. thick laid to cover two floor beam spaces and breaking joints every 3 ft. On this in turn are laid three thicknesses of rosin sized paper, each layer being mopped with tar. The top floor is of 1⅛ in. hardwood, preferably maple, the main beams being spaced 8 to 10 ft. on centers.

The floor is smoother if laid across the line of the plank in the under floor, but traveling loads are better distributed when moved in and out of the factory if the top floor is laid parallel to the lower plank.

Competition for Design of Ornamental Centerpiece for Cement Exhibition.

The central feature of the decorative scheme at the third annual Cement Show to be held in the Coliseum, Chicago, Ill., next February, will be an ornamental centerpiece constructed of cement or concrete. The design is the subject of a competition conducted by the Cement Products Exhibition Company of the city named, and for which three cash prizes are offered.

According to the conditions of the contest the centerpiece may be of either plain or reinforced concrete, concrete blocks or cement plaster, and if of blocks the so-called rock face must not be used. The centerpiece may be finished in any manner, which will produce in the opinion of the designer a pleasing effect. The use of color is admissible as well as decorative detail in relief which can be cast in molds.

Those entering the competition will not be limited in form or type of construction, but each contestant will make his own suggestion for a centerpiece and submit a design for it. The designer, however, must bear in mind that only four days will be available for the construction of the centerpiece in the Coliseum, but structural members or parts may be made in advance and moved into the building four days before the opening of the show.

The centerpiece which will be placed in the center of the main floor of the Coliseum, as shown on the official diagram of the Cement Show, is not to exceed in cost $2000, and each design is to be accompanied by a brief typewritten statement of materials and methods of construction proposed and itemized cost based upon prices of material and labor in Chicago.

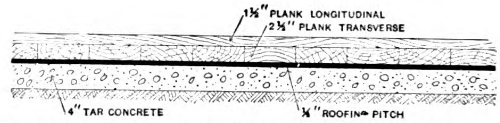


Fig. 2.—Double Floor Bedded in Roofing Pitch on a Base of Tar Concrete.

The drawings required include a floor plan and a section to a scale of ¼ in. to the foot and one elevation to a scale of ½ in. to the foot. An accurate perspective drawing to a scale of ½ in. to the foot to be rendered in color is also required. Graphic scales are to be shown on all designs except the perspective. All drawings must be mounted on heavy pulp board and delivered to the offices of the Cement Products Exhibition Company, 115 Adams street, Chicago, Ill., not later than 5 o'clock, December 1, 1909.

To each design entered in this competition there must be attached a plain blank envelope, sealed, containing the competitor's name and address. No cipher, or *nom de plume*, identifying name or mark shall be on the drawing or wrapper.

The drawings will be considered by a jury of three disinterested persons, two of whom will be appointed by the company in question, and the third by the Chicago Architectural Club. The jury's award will be based upon 1, Appropriateness of design; 2, general attractiveness of design; 3, its adaptability to concrete construction, and 4, cost of construction.

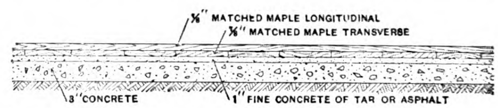


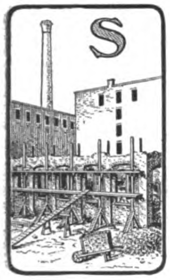
Fig. 3.—Another Form of Serviceable Floor Resting on Concrete Base.

Reinforced Concrete Tower.

The Government is about to erect in Rock Creek Park, Washington, D. C., a concrete tower 600 ft. high, and tapering from a base 50 ft. in diameter to 8 ft. at the top. The tower is to be used for the 3000-mile wireless telegraph station which is to be built from the Navy Department. It is hoped that from this station the Navy Department can keep in touch with vessels of the navy at any point in the North Atlantic ocean.

A GENERAL revival of the decorative arts is one of the encouraging features of the day in house building. Wood carving is to be found in most new residences and apartment houses of the better class, as the taste for it spreads among the educated classes. It is good to study the old masters but not to copy them. For modern American purposes the greatest difficulty will be in choosing subjects.

A HIGH RECORD IN BRICKLAYING.



SOMETHING more than a year ago we briefly referred in these columns to certain methods and devices which had been developed with a view to facilitating the rapid laying of brick in the construction of buildings of all kinds, these representing the result of close observation and long experience on the part of Frank B. Gilbreth, a well-known building contractor. Recently some of these special methods were utilized in establishing high records in bricklaying in the construction of six brick buildings for a box manufacturing concern in the city of Chelsea, Mass. A remarkably large output per man and a low cost per thousand were established, individual records being at times at the rate of 3000 brick per day, while on the last two days of the contract the entire force averaged 2600 bricks per day per man. This last was on 12-in. walls, jointed both sides. An account of the work and the results accomplished was contributed to a recent issue of the *Engineering News*, by L. W. Peck, who was in charge of the cost analysis for Mr. Gilbreth, the general contractor for the work. The matter is of such interest to a large class among our readers that we present the following copious extracts:

In order that the reader may note the process that more than doubled the output, it will be well to start with the arrival of brick on the job. Carload lots of face and common brick, about equally proportioned, were set in on the spur track on one side of the job. Different methods were used in unloading the brick. From one to six men were tried on a car and their work carefully recorded. It was found that one man could unload a car much cheaper than two or more men, provided his individual record or output was recorded, but it was necessary to have six or eight men in each car because the siding was not long enough to accommodate more than three cars, and the brick were being laid as fast as unloaded in some cases. This also saved demurrage.

Charts posted on the field office wall showed the men holding high scores in unloading. Every man wore a button showing his number in large figures. A spirit of rivalry was created, and men on this work needed no other watching than recording their outputs, knowing their record would be marked up as soon as the car was empty.

Special carriers called "packets," holding 18 brick, were used exclusively on this work. These are simply rectangular frames of 1 x 2-in. strips, 8½ in. wide and about 30 in. long, accommodating 18 bricks in two tiers, on edge. They stack readily, whether full or empty, and are convenient to handle.

The men unloading cars sorted the brick and piled them on packets. Packets of exterior and filling brick went onto the wall in different wheelbarrows, and picking over or culling a pile of brick by the masons on the wall was in this way eleminated.

Gravity conveyors were used between cars and storage sheds. These are something like unloading skids in form, and consist of ball-bearing steel rollers set in a frame of bar iron. In the case of two of the buildings, the conveyor carried packets from the car door direct to the elevator. This was as nearly an ideal condition as could be wished. One man taking packets from the conveyor and loading wheelbarrows kept the elevator supplied, which in turn supplied the masons. The highest records on brick work were made where this arrangement was used.

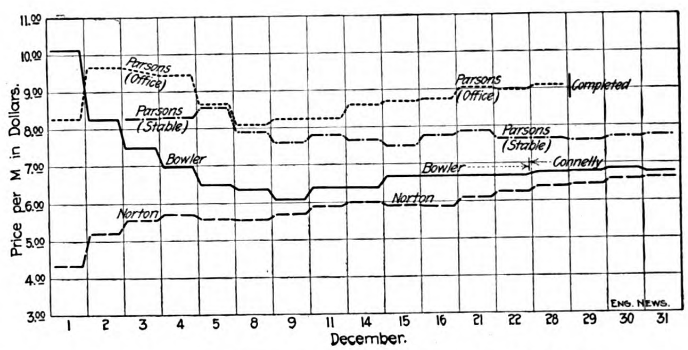
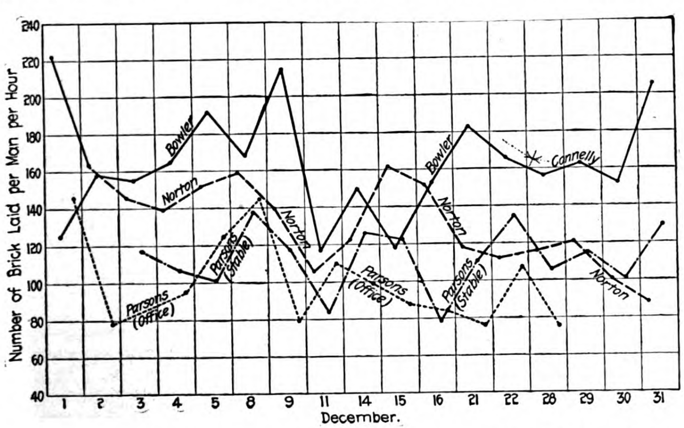


Fig. 2.—Totaled Average Costs of Brickwork on Four Buildings.

(Ordinates show average cost per M. up to date of abscissa. Rates of pay: Foreman, $5 per day; masons, 60 cents per hour; tenders, 30 cents per hour; for eight-hour day.)

The fact that the brick were handled in units of 18 only, up to the time the mason laid them, was but one of the advantages in the use of the packet. Its other important advantages will be realized on considering the time necessary to load loose brick into a hod, carry onto staging and dump, not to mention the time lost by the mason when looking for a certain kind of brick in a disorderly and badly mixed pile, of which many bricks are chipped. Reports of production on packet-handled brickwork demonstrated the economy as compared with ordinary brick hods.



A High Record in Bricklaying.—Fig. 1.—Average Hourly Output per Bricklayer During December, 1908.

Tests which proved that units of 90 lb. were the most economical to handle decided the question of how many brick should constitute a packet. The precise position of the packets on the staging for the best performance was determined by actual trials, and careful comparison of the times required to lay brick. At first the packets were set parallel to the wall, on the theory that the shortest distance from packet to wall should be the determining factor. It was soon found that other factors played a more prominent part, so all packets were placed at right angles with the wall. As there were two piles of brick, face and common, this arrangement made it easy for the mason to reach all the brick all the time, with his wrist normal to the brick—the most natural position. The packet plan of unloading and handling gave the mason the kind of brick he wanted when he wanted them.

All packets were painted black on one end. When brick were put on packets, on edge, the natural top of each brick was placed toward this end. This arrangement of packets on scaffold or floor saved the mason turning brick over or tossing aside on account of being chipped, &c.

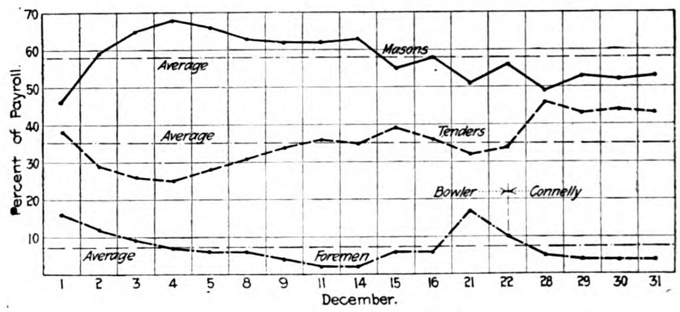


Fig. 3.—Subdivision of Labor Cost on Receiving Building; Foremen, Bowler and Connelly.

Mortar boxes were spaced exactly 3 ft. apart on the staging. Packets were set flush against the left hand side of the box as the mason faced it, leaving space for the tender to step in when placing new packets. Accurate recording proved that this accomplished the best results, although it was hard to convince the masons until the actual figures stopped all argument.

In the arranging of mortar boxes and packets, care was taken that bricklayers did not have to pick brick or mortar cross handed. Even changing the order of box and packet for left handed masons was found to pay.

Trials were made with the mortar boxes at different hights, first close to the floor and afterward raised above the staging. The output was increased materially by elevating the mortar, so horses 12 in. high were built and planks laid on these to form a bench. The cost of these benches was so slight and the output so much increased that it was proven of value to build them even on a pole scaffold. Study of performances also proved that mortar tubs and packets were to the best advantage 19 in. from the wall.

The usual custom for gauging the individual output on a wall is by measurement. Thus, each man works between two marks and there is a tendency among the bricklayers to let each man take care of his allotted portion. To do away with this condition was necessary in following the plan laid out on this contract.

The question of measuring the output of each bricklayer was solved in the simplest way. Each bricklayer was told to pile his empty packets in his individual pile and these were counted each hour by wheeling them past the recorder.

There is a labor rule which forbids the line being slacked out and raised a course until each man has completed his portion. This is consistent with good workmanship. Its result is that the masons finishing first, under ordinary conditions, slow up their work until the delayed men have completed their sections. Counting the packets of the individual workmen changed this. It was found that the bricklayer who finished his section was glad enough to empty his packets by laying brick on the section of the man next who was waiting for stock or was behind for any reason. Instead of slowing his pace and killing time until the other man was caught up, he stepped over a few feet and kept busy.

The time and cost studies on this job proved in repeated instances the previously discovered truth that the losses due to workmen using traditional tools instead of tools best adapted to their work are much greater than the losses from their actual tendency to soldier or loaf. This was found particularly so in the case of the wheelbarrow.

Recording the number of brick each tender handled caused so much rivalry between different foremen, and in fact between the tenders themselves, that the wheelborrow came in for its share of change and improvement. The average barrow holds from 50 to 60 brick, loose. The flat wooden wheelbarrow holds four brackets, or 72 bricks. The "trucket," which is a cross between a wheelbarrow and a baggage truck, was finally adopted. This trucket held 12 packets, or 216 brick. Owing to the fact that the two wheels were well back under the body, the trucket was handled easier than the old-fashioned wheelbarrow. The limit, however, is reached in 216 brick in most cases, as over 1000 lb. is concentrated on two wheels.

To engage the interest of the workmen in the endeavor to increase the output, charts showing the daily performance graphically were posted on the wall in the field office, where they could be seen by everyone on the job. In addition the bricklayer foreman on the building having the highest score one day was permitted to fly the largest flag the next day. Different size flags were provided, from 5 x 8 ft. to 5 x 8 in. There were from four to six buildings under construction simultaneously, and a great deal of rivalry developed among the foremen in the attempt to get the largest flag. Miniature flags corresponding to those on the buildings were put on the charts posted in the field office to mark the race.

The enthusiasm which this system aroused is expressed in the fact that the most pessimistic foremen, who openly opposed the system at the start, were the strongest adherents and firmest believers at the finish.

Reports of the day's work were mailed to the main office daily. Here charts were made up showing the fluctuations of production and labor cost of the several gangs. Specimens of these charts are reproduced herewith in Figs. 1, 2, 3 and 4.

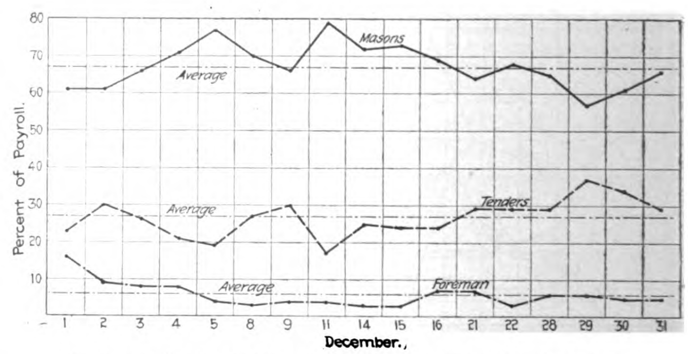


Fig. 4.—Subdivision of Labor Cost on Mill Building; Foreman, Norton.

The chart, Fig. 1, shows the average hourly output per man from day to day on four different buildings. This is interesting, inasmuch as it shows how each gang stood in relation with the others, though it is not sufficient to tell the average efficiency of the foremen. Another chart made from the same data averaged the curves of Fig. 1 progressively, giving the gross average hourly output from the beginning of the job to any date, as is done for costs in the chart, Fig. 2.

In order to judge from these records a knowledge of the conditions that existed upon the several buildings is necessary. For instance, the office building (Parsons, foreman) had the thinnest walls, with fancy cutting for arch work, in view of which an average of nearly a hundred brick per man per hour is very satisfactory. The stable (also Parsons) had a great many openings, plumb corners and arches, and therefore could not be expected to compete with the mill or receiving buildings in number of brick laid. Knowing this, the fact that Parsons is low man in production is not exciting, for in looking at the chart, Fig. 3, it is found that his cost per thousand brick laid is low for that class of work.

The true expressions of the abilities of the different foremen is found in charts Figs. 3 and 4. These endeavor to show the ratio of cost of each class of labor to the total labor cost, 100 per cent. representing the sum of foreman's, bricklayers' and tenders' payroll for the day.

Naturally all that the bricklayers' line can be moved up or the tenders' line down is good. Look at chart Fig. 3. Here is shown the reason why highest production does not get lowest cost in all cases. Note that the average percentage for bricklayers shown on the margin, left side, is 58 per cent., while the average for tenders is 35 per cent. In chart Fig. 4, on the other hand, the bricklayers' average is 67 per cent., the tenders' average showing 27 per cent.

As tenders are not producers of scores by themselves, merely being the necessary evil enabling the bricklayers to run up the records, their percentage should be as low as possible. The saying on the wall for years has been, "a tender to every bricklayer," but performances on this work bring out the fact that the best work, as well as the cheapest, can be done when the tenders are from one-third to one-half the number of the masons.

On two of the other buildings of this group, for instance, the bricklayers' average was 72 and 68 per cent., respectively, and the tenders' average was 21 and 33 per cent. These results were accomplished by the foreman shifting his men to suit conditions on the wall. Had there been no charts showing output, number of men, percentage of one group of men to the whole, &c., these results would not have been made. They show the ability of the foreman to place his men to advantage. Thus, chart D, Fig. 4, shows that Norton watched his tenders pretty closely, keeping their percentage down as much as possible. Under the conditions, Norton's record is good, for his building, the Mill, was straightwalled. There was never a minute when the tenders on this building did not have all they could attend to.

Field charts were made to cover this point especially, to show the various foremen why their records were what they were and point out the particular features which it was desirable to repeat or eliminate.

In considering what was achieved on this contract, allowance should be made for the fact that the brickwork was started in midwinter and was rushed to completion in the fewest possible days, regardless of weather conditions. While the output varied a great deal from day to day, it was far above ordinary results, especially under the difficult conditions of working, the interruptions and delays due to storms and low temperature of a New England winter, slow deliveries of lumber from Georgia to Boston, and the fact that the brickwork was strictly high grade with walls jointed both sides.

The records on these six buildings erected under these conditions in four months, justify the expense of recording individual productions and maintaining a cost analysis department to chart the records and analyze the figures. Creating a spirit of emulation among the workmen down to the lowest grades and posting the scores of performances is apt to be little appreciated by one who has not studied the influence of these factors upon production.

THE latest census returns show that there are many women in the United States whose occupation has to do with building construction, for in addition to the 100 architects, there are 150 women builders and contractors, 167 women masons, 545 women carpenters, 45 women plasterers, 1759 women painters, glaziers and varnishers, 126 women plumbers, 241 women paperhangers and 2 women slaters and roofers.

Why the Chinese Wall Was Built.

To describe the war-like use of the wall properly, a military historian is needed, who can set forth accurately and technically all the strategy involved and the weapons employed. In default of him, a lay view may help the general reader, says W. E. Geil in *Harper's Magazine* for August. The very conception of a chain of thousands of strong blockhouses, linked by a rampart, and stretching over more than a thousand miles, betokens a mind that can conceive great measures. Vast resources were needed to execute the idea and to defend the wall when once erected. A wall would need an army of workmen to erect it, an army of soldiers to defend it. The trowel might be laid aside in a few months, the sword must be ever ready. A mere wall without men behind it cannot delay an invader for a day. The Wall of China involved a standing army. Accordingly, China was the first nation to have a standing army, and historians say it numbered 3,080,000 men.

There are signs in the brickwork that the towers were designed and finished first before any wall was erected. The order was not, therefore, wall first and then towers on it; but towers, and then a curtain between them. In Cuba and in South Africa there was a time when it was found wise to erect rows of blockhouses near enough together to command the intervening space by rifle fire, and numerous enough to stretch for miles. The line of Chinese defence apparently began in the same way; only, as they had no missiles that could be thrown far and swiftly, a solid line of wall became needful at an early stage. We can imagine that each garrison would be charged to build a section of wall on to meet the builders from the next forts, and thus the time would not be idly spent in mere watching.

How Cold Storage Buildings Are Made Heat Proof.

The modern theory of successfully insulating buildings for cold storage and other purposes is based upon entrapped air—air that is actually dead. This means that the air must be in sealed spaces and that the spaces must be minutely small—otherwise the essential idea of "still air" is overthrown. The insulation must depend for its entrapped air upon the interstices or cells of the material employed rather than upon alternate layers of solid insulation and air spaces.

This new principle of insulation, which does away with double walls with air spaces between, has brought into vogue solid insulation, says a writer in the *Cement Age*. In this type the protection consists of layers or blocks of various materials set in Portland pitch cement directly against brick or concrete walls and protected on the inside surface by plaster or tile. The space occupied by solid insulation is much less than that utilized by the older construction. If a fireproof or slow-burning material be used in making the insulation, the fire risk is greatly reduced.

The materials available for this so-called "solid" method of insulation are chiefly cork and compressed mineral wood blocks.

Cork, by virtue of its natural state and apparent use for which nature intended it, lends itself admirably to insulating purposes. In cold storage work, cork is efficient as a nonconductor of heat, is free from capillary attraction and has no tendency to absorb moisture freely. When used as cork boards it is granulated, compressed in iron molds and baked while under pressure, its own natural gum being liquified by the heat and uniting the granules into solid blocks. These have structural strength and are quite fireproof.

MODERN IDEAS IN PLUMBING.

APPARENTLY the efforts of plumbers are at last about to be recognized as factors in bringing about the necessary improvements in plumbing systems. At recent meetings of medical men these efforts have been commended as well as what had been done along the lines of improved sanitation. One result noted by the medical profession is a marked general improvement in public health. If the public would recognize this fact, and in place of abusing the plumbers at every opportunity assist them by exhibiting a good feeling toward them, it would go some distance toward effecting an improvement.

At the present time the laymen, who, in many cases have been posted by the plumber regarding the requirements of a perfect plumbing system, will be listened to in preference to the man who has given the subject a life study, says a recent issue of *Construction News*. This should not be the case, for there are men in the business to-day who are not only intelligent, but have given the subject—*i. e.*, the principles of sanitation—a good deal of thought and study.

Improvements in Principles of Sanitation.

It may not be out of place to give a short description of the many improvements that have been made in the principles of sanitation, mainly through the efforts of the manufacturer and the plumber. In the first place it is interesting to inquire the meaning of the word "plumber." Historically we find he is one who works in lead. The Chinese used lead long before the Christian era, so that we must recognize the Oriental as the pioneer of the plumbing trade. This may not be pleasant news to the plumber of to-day, but, nevertheless, it is true. The Chinese were not the only ones, however, to use lead in early days, for we find that Archimedes, a Greek philosopher, who lived 200 years before the Christian era, made use of lead pipe. It is stated also in the Bible that "lead is a lasting metal for letters," and that David used leaden pipes. These references were to leadworkers, whom we now call plumbers; so that we can consider Archimedes as the first plumber and give the birth date of the trade as 200 years B. C., or bringing it up to the present time, 2109 years ago. Plumbing, therefore, has time; it fades into insignificance when compared with the age of lead using by the Chinese, which commenced about 5000 years ago.

History is silent with regard to plumbing system, and especially so as to fixtures, until the year 1775, when a patent was taken out in England by Cummings, for a water closet. This closet was worked by a slide valve. Two years later Prosser patented a closet very similar to our old Demerset with float valves to regulate the water. Then in 1778, Bramah patented a closet having two valves, one to regulate the water, the other to take it away. This closet had a ground-in brass outlet 4 in. in diameter, a wooden frame and lead lined trunk. Next came Undeshay, who made the bottom valve close on a rubber seat. This invention must have been about the year 1840, as that was the year in which india rubber was first vulcanized and made suitable for the work. Very little improvement was made in this fixture until the old pan closet, with its lead trap, cast iron trunk and porcelain bowl came in, but this, like all the former closets, was not sanitary. There were large unventilated spaces, the air from which could freely escape into the apartment through the opening in the trunk.

Then came the all-porcelain bowl and trap combined, in all shapes and sizes. This line of invention has had a lasting effect. The closet of to-day, with a 3-in. outlet, separate flush valve, assuring every part being thoroughly washed out when operated, if properly installed under modern methods and kept clean is a fixture which, when we adopt the all-porcelain seat in place of the wooden, is not only sanitary, but of pleasing design.

The wash basin has been steadily improving. The old days of boxed-in basins have passed and gone, the shape has also been changed and we now have the clean white enamel and the all white porcelain in a multitude of styles, many of which are very beautiful in design and finish.

Urinal construction has made rapid strides in the last few years, though not before it was needed. The fixture is one of the most difficult to arrange in such a manner that it will be self-cleaning. This is one of the most essential features of a urinal.

We have come from the old lead lined kitchen sink to the sanitary cast iron enameled, and to the all-porcelain sink. The greatest step in the right direction was taken when the boxed-in arrangement around the old sink was disposed of, and with it went the store hole for everything from the kitchen. What a contrast between this arrangement and the present sink and drainer, supported on brackets of the same material!

The materials used for soil, waste and drain pipes have changed greatly. Though they are not perfect yet the improvement has been very great. We have come from the sheet, galvanized and lead soil pipes to the cast iron hub and spigot pipe, which is generally used to-day. This style of pipe should not, however, be used in any building over 90 ft. high. Buildings over this hight should have wrought iron drainage systems. The best features of this system of piping are the greater and more uniform strength and permanence of the joints and the greater flexibility of the pipe and system as a whole.

From the wooden box drain we have come to the tile and cast iron. In some of our larger buildings, where the extra cost of installation need not be considered, wrought iron screw jointed pipe is used. I hope the time will come when this material will be the only one allowed inside any building. I consider the screw joint the only safe joint, where the changes in the temperature are frequent.

Sanitation in Modern Buildings.

A great deal might be said about modern ideas of installing plumbing pipe and fixtures, and about our back venting and local ventilation systems for bathrooms and lavatories. In olden times, one trap for water closet, basin and bath and one waste connection to soil pipe for all three fixtures, was all that was considered necessary. Now we have a separate trap for each fixture, while each trap is kept from siphoning but ventilates every part of the system.

Sanitation in modern buildings is given far more consideration to-day than formerly. Particularly is this seen in the wonderful improvement in plumbing with regard to drainage systems, the water supply and the fixtures. Formerly plumbing fixtures were hidden away in poorly ventilated, poorly lighted, out of the way places, and used only as necessities. They now occupy a prominent place in the house and have become a luxury as well as a necessity.

Ask an experienced plumber of to-day what are the essentials of a perfect system of plumbing, and invariably he will give the following answer:

1. An adequate supply of water to flush the various fixtures.

2. Fixtures that are of enameled iron or porcelain, set open, in well lighted and ventilated rooms.

3. Waste pipes large enough to carry off all waste material, yet not too large to be self-cleaning.

4. A system of ventilation so arranged that it will ventilate every portion of the drainage system properly.

5. A quality of piping for soil pipe and drains that will not corrode, nor be affected by sudden changes in temperature.

6. A thorough system of testing and inspection by practical men, not only when the work is finished but during the installment of all piping.

The plumber is the man who can save the "doctor's bills" and keep away many diseases from the home, through his skill and knowledge of what good plumbing means. He should be encouraged to do the best of work and to become conversant with the best ideas in the trade as to what is required to improve our present plumbing system, which, greatly improved as it is, can yet be made much more perfect.

REPAIRING OLD HOUSES WITH CEMENT.

BY L. H. HAND.

THE writer is of the opinion that the cement plastered house is the best that can be offered in solution of the problem which at the present day confronts the average house owner and home builder of limited means. The only real lumber suitable for clapboards or, as it is termed in this section of the country "siding," was yellow poplar and white pine. To be absolutely accurate, however, I should perhaps say the only good siding was poplar, with pine as a fairly good substitute.

I speak advisedly when I say *was*, because I live in the very home of the poplar and I also live in a poplar house some 50 years old. Of course we have poplar trees 6 or 8 in. in diameter, but it requires 300 or 400 years to grow a poplar 5 ft. in diameter and will again.

We have harvested the lumber crop. Excepting the pine is very expensive, while second grade develops cracks, wind shakes, &c.; soon after being put on.

Now supposing the old house is beginning to need new siding. It is old yet homelike and comfortable every poplar siding of old there is no thin stuff that will repay the time and expense of putting on and painting. Yellow pine will not hold paint and decays rapidly; clear white way, but it has been neglected when it should have been painted, and now the siding is so weather-beaten that it cannot be painted to look well. Something has to be done, and the first thought is to put on new siding and paint. Another thought, however, occurs to us; let us lath and plaster it. I am not thoroughly convinced as to the merits of metal lath over the old wood lath, but I am convinced of the merits of Portland cement as a substitute for each and every piece of woodwork that has to stand exposed to the weather, not excepting even the shingles. But let that pass, it will come along in good time. If the reader desires to experiment try this on some outbuilding first and see how he likes it.

If the frames are in good condition get a lot of strips cut at the mill 1 x 2 in. and break these around the window frames about 1 in. back from the inside edge and saw into the sills just outside of the strips, chipping this part away so it will not project into and mar the effect of the new plaster. This strip should be nailed so it may easily be removed.

Now nail on furring strips one over each stud and lath the exterior walls, cutting all the lath full ⅝ in. short, so the new cement may form a smooth jamb clear back to the old casing. A good idea of the construction suggested may be gained from an inspection of Fig. 1, which represents a horizontal section through a window frame and portion of wall.

In applying the plaster be sure that none of the first coat gets into the space between the removable jamb strip and the ends of the lath, or if it does take a suitable tool and dig it all away, so the coment coat may get clear around the ends of the lath and form the jamb. One hundred yards of outside cement plaster will require 1¼ bbl. of lime, 20 bags (5 bbl.) Portland cement, 1½ yd. sharp sand, 1½ bushels cow hair and 1400 lath.

Run off the lime putty in the usual manner, working in the hair, but using about 1-3 more than for ordinary plaster.

For the first coat take equal parts of lime putty and cement and use this mixture just as one would use lime alone for inside work, mixing the sand into it so as to form a suitable fiber coat. It is imperative that sufficient lime be used in the fiber coat to retard the set of the cement and make the coat flow easily over the lath and into the clinches. It is also necessary to wet the lath very thoroughly ahead of the first coat to avoid lath cracks.

As soon as the first coat is hard enough to stand it follow immediately with a coat of pure cement and sand in the proportion of two and one-half of sharp sand to one of cement. See that the plaster is fully 1 in. thick, for usually the difference between good and bad work is only a question of whether or not sufficient material was used to every 100 yards. It will not break or scale off if it is thick enough, but if, as I have seen, the entire plaster, including the throw coat, was less than ⅜ of an in. over the lath, one may expect it to be a failure.

As soon as the second coat has hardened sufficiently so it will not run when water is thrown upon it apply the throw coat. This is done with a broom and paddle or a trowel according to the finish desired. The throw coat for ordinary rough cast work is usually made of equal parts of Portland cement and sand to which is added just enough lime putty to give it a creamy appearance.

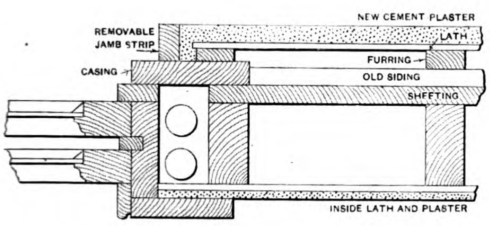
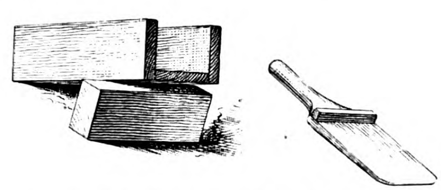


Fig. 1.—Horizontal Section Through Window Frame and Wall.



Figs. 2 and 3.—Open Ended Box and Paddle for Applying "Throw-Coat."

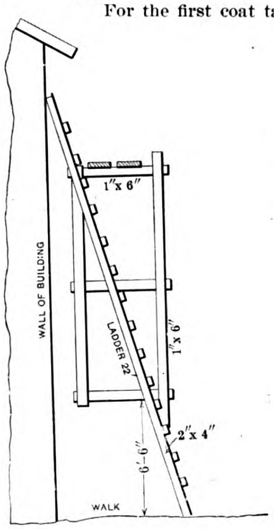


Fig. 4.—Scaffolding for Outside Plaster Work.

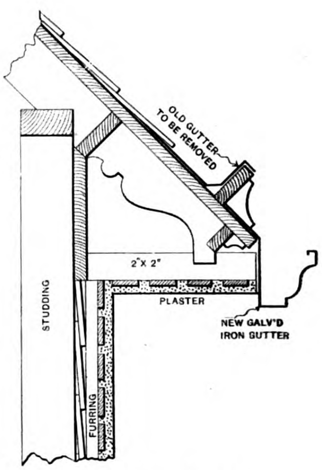


Fig. 5.—A Rafter Finish Cornice.

Repairing Old Houses with Cement.

The tools for applying it are an open ended box set at an angle, as shown in Fig. 2, and a paddle with a little ledger strip across the blade, as shown in Fig. 3. I have seen plasterers using them all the way from 2 in. wide up to 8 in., so it seems to be a matter of choice, and in my opinion is governed like paint brushes by the size of the surface to be coated. The mortar is thrown with a quick motion square against the surface being coated, the paddle just barely missing the work. It is entirely a trick of the hand to throw the coat so it will have a uniform appearance and this is acquired only by practice. Very few people can throw it evenly to begin with, but any one ought to learn the trick in an hour's practice. I recently saw a photograph of a large old farmhouse in Canada which is rough cast finish over split oak lath. The walls to all appearances are in perfect repair and have rendered perfect service for considerably over 60 years. Now, supposing this was a clapboard wall and had been kept thoroughly painted. It is safe to say it would have been repainted 20 times. From an examination of this photograph I should say it would cost the owner of the building at least $40 to paint it, and if it had been kept properly painted it would have cost at this rate about $800 for the painting alone.

Painted wood is a bad proposition out of doors. It looks "too fresh" when first done and in a year looks like a dude 200 miles from a laundry. A piece of stone or plaster "looks good to me," even with moss on it.

In scaffolding for outside plaster it is important to have the scaffolding as free from the walls of the building as possible. In connection with a piece of work which I have in mind there was a walk extending to the adjoining dwelling exactly where the scaffold would naturally stand, and to avoid obstructing this walk I built ladder scaffolds which I had formerly devised on a much smaller scale for work in a factory where benches extended all along the walls. As they proved safe and very convenient as well as portable, it was decided to use them in the present case. They seemed so thoroughly satisfactory in every way that they are well worth illustrating, and in Fig. 4 is shown the general idea as it was carried out.

Suppose now we have an old house with that unsightly monstrosity so common in some parts of the Western States—a rafter finish cornice—and we want to fix it up so as to cut out the painting. We surely do not want a rafter cornice, for there is more painting to the square inch and more profanity while the painting is being done on this particular combination of parts than anything else the writer ever saw. In fact, he once tried to paint such a cornice before he arrived at the years of discretion, and the boss suggested that he hang a pail to his elbow to catch the paint that ran down his arm. In Fig. 5 is a suggestion for remedying this matter very easily, and the additional width to the cornice of the new galvanized iron trough or gutter will usually be found quite an improvement in the looks of the building.

I expect many readers will differ with me in regard to old-fashioned wood lath, and I am aware that many plasterers insist on a scratch coat which is allowed to dry. I am telling only what I think is best based upon my own experience. A little discussion on these points will not hurt any one, and I am sure I never thought I knew it all.

Cleaning Brick Buildings.

A very popular means of cleaning brick buildings is by the use of hydrochloric acid, and provided the acid is not too strong this method may be quite satisfactory. For many purposes, says A. B. Searle, writing in the *Builders Journal*, of London, acetic acid is more satisfactory than hydrochloric acid, as it is equally effective in its action on the dirt without having so corrosive an effect on the bricks. It is more expensive, but owing to its non-corrosive action, buildings on which it is used remain clean longer than when the stronger "spirits of salt" is employed.

The amount of acid and water mixture required will vary somewhat with the care and skill with which it is applied, but will average about 4 sq. yd. per gallon of mixture with ordinary care, and costing for acid about a farthing a sq. yd., with acetic acid, and a half to one-third of this amount for common hydrochloric acid.

When acid is used to clean the face of a building the latter should be first washed over with clean water to remove all the dirt which can be taken off by this means. The surface is next treated with the weak acid—a hard brush, but not one of metal, being used—and finally the building is washed over with clean water to remove any material which has been loosened, but not actually removed by the acid. This final washing may, if desired, be carried out by means of a powerful jet of water, care being taken to work from the top of the building downwards, so as to prevent all accumulation of unsightly spots caused by the "creeping" of the dirt, which always occurs when the building is played on irregularly with a hose.

Use of Soft Soap.

Soft soap has been tried with much success, especially when it has been dissolved in 36 to 40 times its weight of warm water (1 pound of soap in 4 gallons of water) and used whilst still warm. Apparently the most efficient cleaning is obtained by treating the building with clean water, then with the soap solution applied with a hard brush, and finally washing down with water just as was recommended above when acid is used.

Soap has little or no action on clean brickwork or stone, and its effect on soot and similar matters of a greasy nature is far more intense than that of any acid, so that when it is used buildings of either red or buff bricks rapidly regain their original color, unless the cleaning process has been so long delayed that nothing can ever remove the dirt from the bricks. Care must be taken to wash off thoroughly all the soap by means of a thorough playing with a hose or by the more expensive washing over with clean water, or discoloration will be produced. In actual cost the use of soft soap in the manner described works out at practically the same as for acid.

In buildings where the dirt is more of a dusty than a sooty character, it will not usually be necessary to employ any special cleansing material, as a powerful spray of water—such as that from a fire-engine—will usually clean the building sufficiently, providing that the surface of the bricks is reasonably close and dense.

In cleaning terra cotta work, special care must be taken that the surface is not destroyed, as much of the modern terra cotta has a finished or dense face, but an open or porous body, and if once the face is removed it will be almost impossible to keep the building clean.

For buildings which are disfigured by a whitish encrustation, technically known as efflorescence or "scum," the use of very weak hydrochloric acid is always essential, though even this does not always prove a complete remedy. The causes of "scum" are so numerous and complicated that it is difficult to provide any single means of removing this unsightly material.

Scum is chiefly caused by soluble salts in the bricks, which are dissolved when the latter become wet with rain, and as the water dries out it carries the salts to the surface of the bricks and there deposits them. If the scum were only thicker, it would be best to remove it by scraping the walls gently, taking care not to scratch the bricks, but this is not usually practicable, and the least harmful method is to brush the defective surface with a moderately hard dry brush, when the bricks are thoroughly dry. Should this not prove effectual after several times, the surface may be washed over with a little weak acid, and then with water, the disadvantage of this latter method being that it may cause the formation of a larger proportion of soluble salts (through the action of the acid on some of the constituents of the brick), and the remedy may thus prove to be worse than the disease.

The greater part of the scum which disfigures so many buildings is really due to faulty material or to the use of impure water in manufacture, and only in very few instances is it due to the absorption of soluble salts from careless storage of the finished bricks.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—IX.

By EDWARD H. CRUSSELL.

WE will now discuss some of the minor items that fall to the lot of the jobbing carpenter, and to that end will assume that he has been sent to make general repairs to a block of buildings, his orders being to fix up everything and leave them in good shape. Probably the best thing on which to commence will be the doors. The buildings may be new, in which case the doors may have swelled from dampness until they will not shut; or, if the buildings are old ones, the doors may have shrunk so that they leave the rooms very draughty. Perhaps, too, it may be impossible to shut the doors on account of the settling of the building.

It has come under the writer's notice that there are many men who do not go at the refitting of a door in the proper manner. Some of the methods he has seen employed are hardly creditable to any one of average intelligence. For instance, some men will plane away at

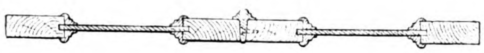


Fig. 54.—Section of a Pair of Double Hung Doors, with a Molding at Their Meeting Edges.

the doors were of thoroughly kiln dried ash. The weather being damp, it so happened that the doors had swelled up again until they were as bad as ever. The proprietor of the building called up the "boss" and declared by all that was good and great the doors had never been touched because "he was out there yesterday and the doors were worse than ever and there wasn't a sign of anything having been taken off them." He was quite honest in his convictions and had to be shown how it was done before he would believe it.

The foregoing is mentioned simply because it illustrates the fact that even a careful mechanic does not get all the credit due him because of his repair work being finished up in such a manner that it is noticeable only to the experienced eye. If some men had been at the refitting of those doors there would not have been much doubt as to whether or not anything had been taken off them.

When refitting the doors of old buildings that have settled, the jambs are generally out of square and it is often necessary to piece out the doors to make them fit. Most workmen make the patch or filling piece the same shape as the space between the door and the door jamb; that is to say, wedge shape, tapering from ⅜ in. to nothing. This shape of filler is difficult to make and next to impossible to properly fasten unless it is glued in place and fitted after the glue is dry. Even then the thin feather edge is liable to get broken off. The proper

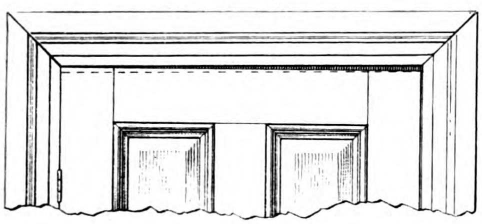


Fig. 55.—Head of Door with Jamb Out of Square.—Dotted Line Shows How Door Should Be Cut so as to Have Filling Piece of Parallel Thickness.

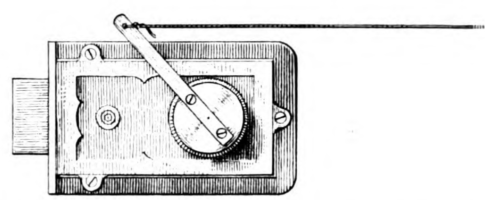


Fig. 56.—Showing Night Latch with Small Lever Riveted to Knob for Purpose of Opening Door with a Cord from a Distance.

The Jobbing Carpenter and Some of His Work.—IX.

the top and bottom of the striking edge of the door, appearing to trust to luck and hoping that the portion where the lock is will shrink back of its own accord. Some will endeavor to coax the lock back out of the way of the plane with a few sturdy blows from a nail hammer. Others he has seen plane the clearance from the top and bottom of the edge of the door and then remove the striking plate from the door jamb and give the necessary clearance there with a rabbit plane. Still others would remove the lock, refit the door and then make the best job they could of getting the lock back into place again.

The method of the writer is to remove the butts, give the clearance from the back edge of the door and then refit the butts. In many cases it will be found that refitting the butts is all that is necessary, as some of the larger ones will sag open after they have been up a while far enough to make the door bind.

In double hung entrance doors, where they have a molding at their meeting edge, as shown in the cross section, Fig. 54, it is sometimes easier to remove the molding and give the door clearance from behind it, but this will depend upon how the molding is fixed to the door. Where it is properly fastened with screws the door can be refitted and no marks left to show what has been done to it.

The writer once refitted a pair of entrance doors in a public building in this manner. The building was new and

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—EDITOR *Carpentry and Building.*

method is to scribe and cut a small portion off the door so that the piece to be applied will be parallel in thickness. An inspection of Fig. 55 will make this clear. Indeed the space between the door and the door jamb is somewhat exaggerated in order to make things plainer, and the dotted line shows how the door is cut so as to have the filling piece the same thickness throughout. In other cases it is better to move the butts a trifle, fit the top of the door to the jamb and then piece out with a parallel strip, firmly fastened to the door at the bottom, especially if there is a space at both top and bottom of the door. A little thick white lead paint is better than glue for applying to the joints in work of this character.

Among the meanest jobs that fall to the lot of the carpenter, the refixing or fitting of sliding doors must be given a foremost place. They are one of the things that are easy enough to fix at the beginning, but after the house is built and the doors have been up for some time to go and correct mistakes that have been made in the setting of them is a job in which a man has to expect about as much from good luck as from his own abilities. What is wrong with the doors may be any one of a dozen different things, arising from as many causes, and it is hardly possible to give anything but a little general information on the subject of setting them right again. Anything wrong with the jambs or stops of any of the exterior portions of the woodwork can of course be easily seen and in most cases as easily rectified, but usually the trouble will be back in the wall, where it is hard to see and harder yet to reach.

Though the trouble may arise from different causes it nearly always amounts to the same thing, which is that the door sags or binds somewhere back in the wall. The remedy is to take down the doors, reach back into the wall with a long handled chisel and give them clearance where necessary. If a good sharp heavy chisel is used it can be worked without the aid of a mallet. The greatest difficulty and annoyance is the lack of light. An electric light bulb on the end of a stick is a good thing, though a well protected lighted candle is better than nothing. The candle can be fastened securely to a narrow strip of board and placed back in the wall where it will do the most good. Unless the light is protected with a wire screen great care must be exercised in its use or there will be some danger of starting a fire with the contrivance.

Removing Base and Moldings.

In some cases of the old-style doors that are fitted with floor guides the base on one side of the double partition that forms the wall pocket is made removable, so that if anything goes wrong with the guide back in the wall the base may be removed and access had to the seat of the trouble. Sometimes these removable baseboards by reason of the screws being countersunk and puttied over are more difficult to remove than if the base boards had been nailed in the usual manner.

It often falls to the lot of the carpenter when making alterations to be obliged to temporarily remove moldings and other woodwork, and some men if left to themselves make rather a poor job of it. Most of them can get the molding off without damaging it, but the trouble arises when attempting to replace it. Nine out of ten of them will drive the old nails out and splinter the face of the work so badly that it can never be made good again. It is impossible to back out nails that have been puttied in without seriously marring the face of the woodwork, and as quite often happens the only reason for using the old woodwork is to save the painter a job, some other method must be found for removing them. If they are ordinary wire finishing nails with small heads they may be pulled right through the board with a pair of pincers or pliers. If they have large heads which prevent them being pulled through in this manner, nick each side of them close to the surface of the board with the edge of a half round file and a tap sideways with the file will break them off. This is of course a very simple matter, but it is one of the many small things that show the difference between the good mechanic and the "duffer."

Before leaving the subject of doors it will perhaps be well to say a few words upon the theme of door hardware. It has been mentioned elsewhere in these articles that the old-time locks were as a general thing much larger than those in use at the present day, and that to replace an old lock with a new one was sometimes rather a problem. To avoid this the writer has, when the occasion warranted it, taken a new lock to pieces and used the springs or other parts of it to repair the old lock. Where the old lock is past all repair the best plan is to fill all the holes in the door with pieces of wood carefully fitted in and glued and then when the glue is dry the door can be treated as if there had never been any holes in it.

Trouble With Locks.

Much lock trouble in new work is often caused by the painter running a brush full of varnish down the edge of the door right across the face of the lock. The varnish gets on the spring bolt of the lock and is hardly noticeable, but when it dries a little and gets "tacky" if the bolt is turned back into the lock it sticks there and some one noticing it finds fault with the man who put on the lock for not properly doing his work. Once the cause of the trouble is known it is easily removed. The varnish can be scraped from the bolt with a knife blade and a few drops of oil renders everything as it should be.

A nice little job for the carpenter is to open a locked door fitted with a mortise lock in which there is a piece of broken key. If the door is hung with loose pin butts it is sometimes possible to take out the pins and open the door from the hinge side. This, however, does not often happen, for unless there is a lot of play in the door the thick portion of the butts will prevent it opening. The only thing then to do is to make a wide wedge of soft wood and drive it in between the striking edge of the door and the door jamb close to the lock bolt until door and jamb are separated far enough to release the bolt from the striking plate. If the door is properly fitted it may take two or even three wedges to do the job properly. The reason for using wide wedges of soft wood is to prevent them marking the door. There are some pieces of door hardware for which it is necessary to have the maker's instructions before they can be correctly applied. Among these mention may be made of the cylinder night latches and the various makes of combined door checks and springs. The cylinder night latches are not as rare to-day as they were some 12 or 15 years ago and almost any of our present-day mechanics could put any of them on without the printed instructions. The more general mistakes made by the inexperienced in applying them are to bore the hole for the cylinder too small and sometimes to put the cylinder on upside down. This latter mistake has been made even when the instructions were at hand and the edge of the cylinder marked "this side down."

In all of the better class of night latches the bolt is moved by turning the knob instead of sliding it back as was formerly the case. This makes it a little awkward whenever it is necessary to open the lock with a cord or chain from a distance. One way of overcoming the difficulty is to rivet a small strip of metal to the face of the knob, thus forming a lever to which a cord may be attached, as shown in Fig. 56. A cheaper way and almost as good is to take the cord and after tying it to the knob wind it around the stem of it until there is sufficient leverage to draw the knob back. Be sure and wind the cord in the right direction, while a little cobbler's wax or even liquid glue applied to it will make it grip the knob stem still better.

Door Checks and Springs.

Door checks and springs as a general thing require careful measurements and fixing, and if one should happen to have the article without the directions for applying it he will in most instances save time by looking up some good hardware store and asking permission to see an instruction paper from the box of one of the door checks they have in stock. It is a good idea for the jobbing carpenter to have a collection of these instruction papers covering all the various kinds of hardware that he is likely to be called upon to fix or apply. They are easily obtained, for the manufacturers' supplying the articles are just as interested in having their goods properly applied as is the carpenter, and a request for one of these papers accompanied by the reasons for wanting it, together with a stamped and addressed envelope, will usually bring results by return mail.

To close this article upon the subject of doors and door hardware, the writer would like to mention an instance that once happened to him and came near getting him into serious trouble. He had been sent for to fix one of a pair of large swinging entrance doors in a restaurant. The proprietors said "it just wants a little easing at the bottom."

The door was of oak 3 in. thick, 3 ft. wide and 10 ft. in hight. It had a large fancy shaped beveled edge plate glass in it and was covered with heavy carvings, some of which projected from the surface of the door a full 8 in. Altogether the door must have weighed close to 500 lb. When the writer arrived on the scene the door was standing open at a right angle with the outer lower corner resting on the floor. The writer took hold of it carelessly and tried to pull it shut, when without any warning the whole mass started to fall over on top of him. He does not know to this day how he managed to catch it and push it into a perpendicular position again, but he does know that he felt the effects of the exertion for months afterward. What was subsequently found to be wrong with the door was this: The door was hung on pivots at top and bottom, the lower pivot being connected to a large cast iron weight in a cavity beneath the floor. This weight was for the purpose of swinging the door shut, taking the place of a door spring. The upper pivot is shown in Figs. 57 and 58, the former being a plan view and the latter a longitudinal section. After the writer had set the door up again, borrowed a waiter to hold it, he borrowed a stepladder to see what had gone wrong with the upper pivot. The first impression was that it had broken off, for the pivot plate showed a level surface and there was no sign of a pivot on it. A glance at Fig. 59 will make clear to the reader what had really happened. The pivot plate was adjustable and by turning the screw B the pivot could be moved either up or down. In some unaccountable manner it had worked back until it was in the position shown in Fig. 59, and of course had allowed the door to drop over until the outer corner rested on the floor. It may be stated that the floor was of tile, and as there was no threshold the door had very little clearance. That it should have dropped off in the only position where it could possibly have remained upright was something of a miracle, but it seemed more of a miracle to me that I had been able to get this far with the job without doing about $50 worth of damage. I learned afterward that the two doors with the frame and fanlight had cost in the neighborhood of $500.

In the illustrations, A is the pivot, B the adjusting screw, and C C the guides. I had never seen anything like this before, and of course all the mechanism was

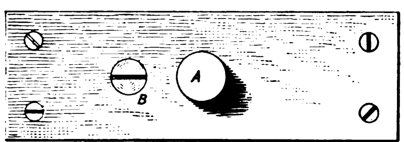


FIG. 57.

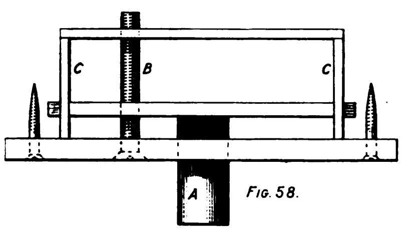


FIG. 58.

Figs. 57 and 58.—Plan and Section of Pivot Plate with Pivot Down.

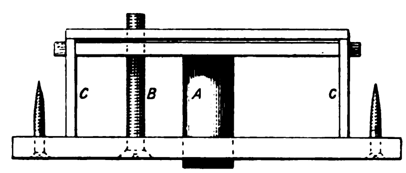


Fig. 59.—Pivot Plate with Pivot Raised.

The Jobbing Carpenter and Some of His Work.—IX.

hidden in the woodwork until I started to take it off. I commenced at the screw B, it being the largest, and was surprised to see the pivot come down into its place again. I was never able to account for the pivot working up out of the door. At first thought it seemed as if some one else must have been at the job ahead of me—a not uncommon occurrence—but when this was suggested to the proprietor he give it a most emphatic denial, and as that was absolutely all that was wrong with the door I had to believe him, for the job was childishly simple once it was discovered that the pivot would move.

Some Features of Concrete Construction.

In the discussion of concrete construction the word "problem" creeps in with great frequency, and an examination of printed records would doubtless show that it had been applied to every phase of concrete development, says a late issue of the *Cement Age*. It is worth noting, however, that many of these so-called problems have proved to be not problems at all, but merely opinions unverified.

An interesting illustration of this may be found in the oft repeated and generally accepted statement that concrete cannot be made water tight without greater trouble and expense than would occur in the use of another material. After investigation and experiment it was reported by the Committee on Waterproofing at the recent meeting of the American Society for Testing Materials that it is not at all difficult to make concrete waterproof. A poorly made and porous concrete will admit moisture just as in the case of porous stone or brick. But concrete that is dense and without voids will turn water. Even concrete not moisture proof at first has become so after a lapse of time. Hydrated lime and waterproofing compounds have helped matters from the start. But in spite of known facts it is still very common to hear it said that the greatest objection to concrete is that it is not waterproof.

Another case in point is the painting of concrete surfaces. At the meeting referred to above a member of the society expressed the conviction that in time there would be found an ideal paint for concrete, but that at present it is not to be had. This called forth testimony on the part of others, who cited occaesions where paint had been applied with success. We frankly confess that the problem to us in this instance is why anybody, except for some unusual reason, should wish to paint a concrete surface. It certainly would not add to its beauty. Many have solved surface treatment to their satisfaction by the simple application of old-fashioned whitewash, plain or tinted. Repeated applications and the influence of time have given very satisfactory results in the way of tone and color. Yet we hear it said that concrete would be immensely more satisfactory if oil paint could be made to adhere to its surface. Similar criticism relates to staining and streaking. Examination of any stone or brick building will disclose the same defects, but we are so accustomed to this that it excites no comment or adverse criticism. Thus, these great problems from time to time disappear, and concrete is rapidly growing in favor in spite of a lack of affinity for oil paint, its propensity to admit moisture when made lean and porous, or its failure to keep spotless and immaculate in a dirty, smoky city, shortcomings characteristic to greater or less degree of all other materials.

The Veneered Wood Industry.

During the year 1908 there were cut into veneer 382,542,000 ft. b. m. of logs, valued at $7,891,000, as against 348,523,000 ft., valued at $6,436,000, in 1907, according to statistics just published by the Bureau of the Census in co-operation with the United States Forest Service. Although industrial conditions generally were unfavorable during the year 1908, the amount of wood cut into veneer increased, substantial gains being made in the quantity of both imported and domestic wood consumed. This was due in a measure to the closer canvass in 1908, when returns were received from 402 active establishments located in 34 States, as against 370 in 31 States for the preceding year.

Red gum, as in the preceding year, ranked first among the woods used for veneer, 119,945 ft. being consumed, with a valuation of $1,272,096, forming a percentage of 31.4 of the total consumption. The demand for red gum was even greater than in 1907, when its percentage of the whole consumption was 29.5. Among other woods, with the exception of yellow pine, which shows an important increase, no great increase is noted.

The principal woods imported for the industry were mahogany and Spanish cedar. Of the former 11,487 ft. were used, with a valuation of $1,478,364, as against 6722 ft., with a valuation of $839,695, in 1907.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

CHARLES T. ROOT, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - VICE-PRESIDENT
W. H. TAYLOR, - - - SECRETARY AND TREASURER

Entered at the New York Post Office, as Second Class Mail Matter.

NOVEMBER, 1909.

With this number I relinquish the control of this journal, with which I have been connected from its commencement. It is with pain that I take my leave of the editorial staff, to whom so much credit is due for the high reputation achieved by *Carpentry and Building*. The purchasers are men of standing and eminently qualified for the task they have undertaken. I have known Mr. Root for many years and entertain for him a profound respect and regard, not only as a peculiarly able publisher, but as a charming and high-minded man. His associates are publishers of character, experience and skill. I feel that the publication is safe in their hands and wish them all possible prosperity and success.

DAVID WILLIAMS.

New Features of Workmen's Compensation Act.

The development of the operations of the workmen's compensation act, the British counterpart of our employers' liability act, is of interest in this country, where there promises to be a need of some amendment to the present laws governing the payment of damages to employees. The British act provides that the employer shall pay to the injured workman or his dependents, in case of his death by accident, certain damages regulated on the basis of his wages. The amounts do not approach the usual jury awards in American employers' liability cases, but, on the other hand, while the employer here is legally blameless where the accident results from the negligence of the victim or of his fellow workman, in Great Britain the question of negligence does not enter into the case, except where the accident is caused by the "serious and wilful misconduct on the part of the workman." This feature of the law is comparatively new, and the decisions so far rendered have been watched keenly by all interested persons. An English textbook defines "serious and wilful misconduct" thus: "If a workman does something which he ought not to do, or omits to do something that he ought to do, he may be guilty of negligence, or possibly of misconduct, but that in itself is not sufficient to disentitle him from compensation. The word 'wilful' imports that the misconduct must be deliberate, and not a thoughtless act done on the spur of the moment. It is not the act itself, but the wrongful element in it that must be wilful." For purposes of illustration it may be pointed out that in one case, a workman riding with others through a mine tunnel on the top of a loaded car, a practice prohibited by regulation, was killed by a stone which fell from the tunnel roof. The fact that the men on the car did not cause the fall of the stone led the court to decide in favor of the dependents of the deceased on the ground that the injury was not attributable to his misconduct, as there was no casual relation between his misconduct and the injury he had sustained. In another case, the special rule of a mine imposed upon the miner working at the coal seam bottom of the mid-working, the duty of keeping the gate which fenced off the working of the shaft closed until the cage had been brought to the level of the working and had come to a standstill, so that it might be safely entered. The miner opened the gate before he had ascertained that the cage had been brought to the level, and assuming that the cage was there pushed his car forward. It fell, and he with it, and he was injured. The court has decided that this was serious and wilful misconduct. Failure to profit by the warning of another workman may also come under this head, according to the decision in a recent case. A miner going along a main haulage line, in which at intervals were manholes for safety, was warned by a fellow workman in one of them that the cars were not far off. The warning was unheeded, and after passing several manholes and failing to take advantage of them he was overtaken by the train and killed. The whole system of workmen's compensation seems foreign to American institutions. Yet the burden imposed, even where only most unusual circumstances relieve the employer from liability, may be no more onerous than an employers' liability law when juries are not always open minded and fair.

Fireproof Roofing Ordinance.

The tendency toward fireproof building construction is becoming more and more pronounced and is daily manifested in the various steps taken by concerns and municipal authorities in connection with matters affecting the erection of fire resisting structures all over the country. One of the latest instances looking to this end is the action of the City Council in San Antonio, Texas, where there was an ordinance prohibiting the use of wood shingles within the fire limits and requiring the use of a fireproof roof covering. This ordinance had been in operation for a considerable period, but those who had other kinds of roofing material to sell endeavored to have the City Council rescind the ordinance. As a result of an action instituted to that end, the council appointed a special Committee on Fire and Fire Limits, which held an open hearing, and the council has now unanimously approved the original ordinance with instructions that it be enforced without exception. This decision is an mportant one in many respects. It shows that those instrusted with the government and welfare of the people concluded, after selfish interests had a hearing, that the welfare of the city, the best protection of the homes and the greatest good to all concerned could only be realized when the use of material was fostered which would protect against fire and impede a conflagration in the city. This should encourage men engaged in the roofing business throughout the United States. No more important work was ever brought to the attention of the National Association of Master Sheet Metal Workers than when the motion, made by W. H. Barnard, was carried authorizing the appointment of a Committee on Legislation to devote its attention to the collection of information that could be laid before the governing bodies of a city to secure ordinances which, while incidentally giving the tin roofer a wider field in which he could work in competition with the slate roofer and others using noncombustible roofing materials, would protect the city and its buildings.

An Air Cooling Scheme.

An arrangement which is very simple, yet is said to give entire satisfaction, is used in cooling the air in the court theater at Vienna. The air is conducted through an underground passage about 260 ft. long divided longitudinally by a vertical wall, the air passing through both channels. In one is arranged the cooling apparatus, which includes 276 zinc trays arranged in six groups, on which trays is discharged water for the cooling process. The air in traversing this passage is cooled and saturated with vapor. The other channel contains no such apparatus. The two currents of air unite at the end of the passage into a common duct. A system of valves similar to louvers provides for mixing the desired volumes of air from each of the channels. The cooling apparatus is employed only on very warm and very dry days. Normally the natural temperature of the subterranean passage suffices.

Officers of New York State Council, United Brotherhood of Carpenters and Joiners of America.

The third annual convention of the New York State Council, United Brotherhood of Carpenters and Joiners of America, was held in the city of Troy, September 18 to 20, inclusive, when the following officers were elected for the ensuing year:

President, T. M. Guerin, 290 Second avenue, Troy, N. Y.

First Vice-President, Grant Nelson, Elmira, N. Y.

Second Vice-President, Thomas Gilmore, Albany, N. Y.

Secretary-Treasurer, Thomas W. Bunting, 796 Clason avenue, Brooklyn, N. Y.

The Executive Board consists of the following:

First District, William H. Mears, White Plains, N. Y.

Second District, George W. Hilliker, chairman, Poughkeepsie, N. Y.

Third District, Elihu Ackerman, Oneida, N. Y.

Fourth District, Charles W. Van Wie, Oswego, N. Y.

Fifth District, E. K. Atwater, secretary, Auburn, N. Y.

The convention extended an invitation to all State councils of the United Brotherhood of Carpenters and Joiners of America to send fraternal delegates to the fourth annual convention of the New York State Council, which will be held in the city of Rochester, N. Y., October 31, 1910.

An Office Building for Madison Avenue.

Another of the heretofore important residential sections of the metropolis is being invaded as a result of the demand for commercial buildings, the contracts having recently been awarded for work on a new 20-story loft and office structure which will rise on the site at the northwest corner of Madison avenue and Thirty-eighth street, Borough of Manhattan, N. Y. The plot is 75 x 100 ft. in size, although on the Madison avenue frontage owing to an existing restriction the building will be set back 5 ft. on the northerly 25 ft. of the plot. The structure will be fire-resisting throughout, the frame being of the steel skeleton type, the floors of concrete and tile, the window casements of copper and the doors and trim of steel. The first five stories of the exterior will be of limestone, with imposing columns to the third story; above the fifth floor the façade will be of specially enameled brick, while the top five floors will be of terra cotta surmounted with a copper cornice. The roof will be of brick.

According to Buckman & Fox, the architects, the cost of the building will be in the neighborhood of $650,000. Light and ventilation have been the chief objective points in the designing of the structure and very few columns will be placed in the interior, thus giving the tenants all the space possible. The lofts will be so arranged that they can be divided to suit the tenants so that if necessary more than one can occupy a floor. Five elevators will be installed, three for passengers and two for freight. In addition there will be one sidewalk elevator. The property owners in the Murray Hill section, as this part of the city is known, are making protests on account of its invasion by mercantile structures, and some time since litigation was started when the announcement was made that a building of this character was to be erected at the corner of Thirty-fourth street and Madison avenue.

Number of Tiles for a Given Area,

The building contractor who at times includes in his operations the setting of the tile will find the accompanying table, reproduced from the *Mantel, Tile and Grate Monthly*, of great convenience in arriving at the number of tile of given dimensions and shape required for a given area. After computing the area of the surface to be tiled and having learned from the owner or architect just what size and shape of tiles are desired it is an easy matter to arrive at the number required by multiplying the area in square feet by the number of tiles given in the table for each square foot of surface.

No.	Shape.	Size in inches.	Number in square feet.
1	Square	6 x 6	4
2	Diagonal ½	6 x 6	8
3	Square	4¼ x 4¼	8
4	Diagonal ½	4¼ x 4¼	16
5	Square	3 x 3	16
6	Diagonal ½	3 x 3	32
7	Square	2⅛ x 2⅛	32
8	Diagonal ½	2⅛ x 2⅛	64
9	Square	1½ x 1½	64
10	Diagonal ½	1½ x 1½	128
11	Square	1 1-16 x 1 1-16	128
12	Diagonal ½	1 1-16 x 1 1-16	256
15	Square	2 x 2	36
16	Square	1 x 1	144
17	Oblong	6 x 4	6
18	Oblong	6 x 3	8
19	Oblong	6 x 2	12
20	Oblong	6 x 1½	16
21	Oblong	6 x 1	24
22	Oblong	4¼ x 2⅛	16
24	Oblong	4¼ x 1 1-16	32
25	Oblong	3 x 1½	32
26	Oblong	3 x 1	48
27	Oblong	2⅛ x 1 1-16	64
28	Octagon	6 x 6	4 4-7
29	Octagon Diagonal ½	6 x 6	9 1-7
30	Octagon Square ½	6 x 6	9 1-7
31	Octagon Square ¼	6 x 6	18 2-7
32	Hexagon	6 x 3	10 2-3
33	Hexagon Long ½	6 x 3	21 1-3
34	Hexagon Short ½	6 x 3	21 1-3
35	Octagon	3 x 3	18 2-7
42	Hexagon	6 x 5 3-16	6 1-6
43	Hexagon Diagonal ½	6 x 5 3-16	12 1-3
44	Hexagon Square ½	6 x 5 3-16	12 1-3
48	Pentagon	5 5-16 x 2⅛	14 2-9
49	Octagon	4¼ x 4¼	9 1-7
50	Octagon Diagonal ½	4¼ x 4¼	18 2-7
51	Octagon Square ½	4¼ x 4¼	18 2-7
52	Oblong	3 x ½	96
54	Oblong	6 x ½	48
55	Hexagon	4¼ x 2⅛	21 1-3
56	Hexagon Short ½	4¼ x 2⅛	42 2-3
57	Hexagon Long ½	4¼ x 2⅛	42 2-3
58	Square	½ x ½	576
59	Oblong	6 x ¾	32
60	Hexagon	3 x 3 15-32	18 2-7
61	Hexagon Diagonal ½	3 x 3 15-32	36 4-7
62	Hexagon Square ½	3 x 3 15-32	36 4-7
63	Oblong	3 x ¼	192
64	Hexagon	2 x 2 5-16	41½
65	Hexagon Diagonal ½	2 x 2 5-16	83
66	Hexagon Square ½	2 x 2 5-16	83
70	Oblong	9 x 3	5 1-3
71	Oblong	6 x 4¼	5 11-17
72	Oblong	1 1-16 x 17-32	256
77	Oblong	5 x 10	2 22-25
81	Hexagon	2 5-16 x 2 21-32	31 2-10
82	Hexagon Diagonal ½	2 5-16 x 2 21-32	62 3-5
83	Hexagon Square ½	2 5-16 x 2 21-32	62 3-5
84	Hexagon	1¾ x 2	54¼
85	Hexagon Diagonal ½	1¾ x 2	108½
86	Hexagon Square ½	1¾ x 2	108½
87	Triangle	3	37
88	Half Triangle	3	74
89	Triangle	1 47-64	109 5-7
90	Half Triangle	1 47-64	219 3-7
91	Triangle	1 5-32	249
92	Half Triangle	1 5-32	298

In regard to the above it may be stated that a small number of tile should be added ordinarily to cover breakage and losses.

CORRESPONDENCE.

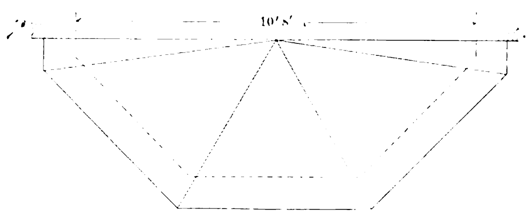
Framing Roof of Octagon Bay Window.

From F. B., Bryn Mawr, Pa.—Grant me the privilege of your valued correspondence columns by inserting the following queries which I believe to be of general interest. What is the correct method for obtaining all lengths and bevels for a roof of an octagonal bay window constructed as shown by the accompanying sketch, with a 10-in. projection for cornice?

With so small a roof as the one dimensioned is it not more practical—being more economical—to "pound" the problem out with bevel and straight edge?

A Question in Rafters.

From L. H. Hand, Chicago, Ill.—I would like to say to "W. H. P.," Philadelphia, Pa., whose letter appeared on



Framing Roof of Octagon Bay Window.

page 249 of the current volume, that if he will cut a pair of 45-degree rafters for any building and lay them down as shown at A in the accompanying sketch he will see that they follow the center line of his valley exactly, but the rafters of any other pitch as shown at B in the diagram do not. In other words, the length of a 45-degree rafter for any building is the length of the base line of the valley or hip rafters regardless of pitch.

I was much interested in the complimentary letter of "Hee H. See," Sacramento, Cal., in the same issue of the paper. It is possible that my appreciation was stimulated in a degree by the fact that I railroaded for 13 years. I would like to ask Mr. See what kind of beds and boarding houses he strikes out in his section, and how he likes wrecking in a sleet blizzard with all the other nice things about the job. "We fought in the same campaign."

From A. H. J. C., Kennebunkport, Maine.—Answering the inquiry of "W. H. P.," Philadelphia, Pa., regarding the run of the hip rafter, I would say that there is no need of a diagram, as he suggests, to prove that 16.97 ft. is not 14.42 ft. For instance, supposing a house to be roofed is 24 ft. wide, the run of the rafter would be 16.97 ft. and this would also be the length of the common rafter. Now the run of that hip would never change, whether the roof be ¼, 1-3, ½ or 2-3 pitch, but the length of the common rafter is different for each pitch. As he speaks in particular of 1-3 pitch, I would say the common rafter for it would be 14.42 ft., hence my omission of the diagram referred to by him in the original inquiry.

From J. O. P., Palestine, Ill.—In answer to the question of "W. H. P." in the July issue, I would say the reason the length of a common rafter on a 45 degree pitch represents the run of the hip is because the rise happens to be the same as the run of the common rafter, while the common rafter on a one-third pitch roof "of a building 24 ft. wide, for instance," represents the hypotenuse of a right angle triangle, the two sides of which are 8 ft. and 12 ft.—the rise and run—while the run of the hip rafter represents the hypotenuse of a right angle triangle, the two sides of which are 12 ft. and 12 ft.—the run of the common rafter each way, which in this case would be 16 ft. 11 10-16 in., while the length of the common rafter would be 14 ft. 5 1-16 in.

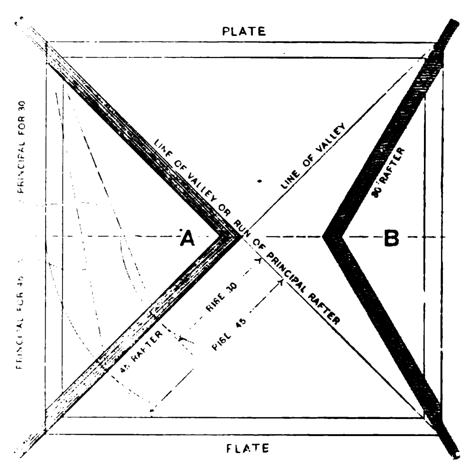
Rafter-End Under Hip Between Roofs of Unequal Pitch.

From P. J. L., Pittsburgh, Pa.—I would be pleased to have you inform me through the columns of *Carpentry and Building*, how to get a finished (scroll cut) rafter end to be used under the hip of the roof of a door hood, the front and sides of same having different pitches, as shown by the roof plan of the enclosed sketches. I wish to know how to cut the profile in one operation or piece as shown in plan B, and how to cut it so as to form a miter as in plan A; also how to get the backing.

Answer.—In the group of diagrams presented herewith, Figs. 1, 2 and 3 contain the substance of our correspondent's sketches, while the profile which he shows is essentially the same as that shown in the lower part of Fig. 5. The problem of the angle bracket or rafter end presents no great difficulties so long as the soffits of the cornices on the two sides of the miter have the same pitch. But when the pitches are different, difficulties are bound to arise. Different expedients often suggest themselves, neither of which will in most cases give a satisfactory result, when the case eventually becomes one of choosing the least of several evils. An analysis of the conditions involved will no doubt be both interesting and instructive to our readers.

Every builder knows that when the pitches on the two sides of a hip are different, one of two things must be done to keep the eave line level. Either the projection on the side having the steepest pitch must be decreased, or the wall plate must be raised. An inspection of the plan Fig. 1, shows that the side pitches are steeper than that of the front, because $d\ e$ is less than $e\ f$. In Fig. 4 is shown a design for a rafter end supported on the wall plate, the pitch of rafter being that intended for the front of the hood, immediately above which, and starting from the eave at g, is drawn the pitch for the side rafter. The diagram shows that the rafter for the side passes entirely above the wall plate.

As an expedient it may be suggested that to keep the



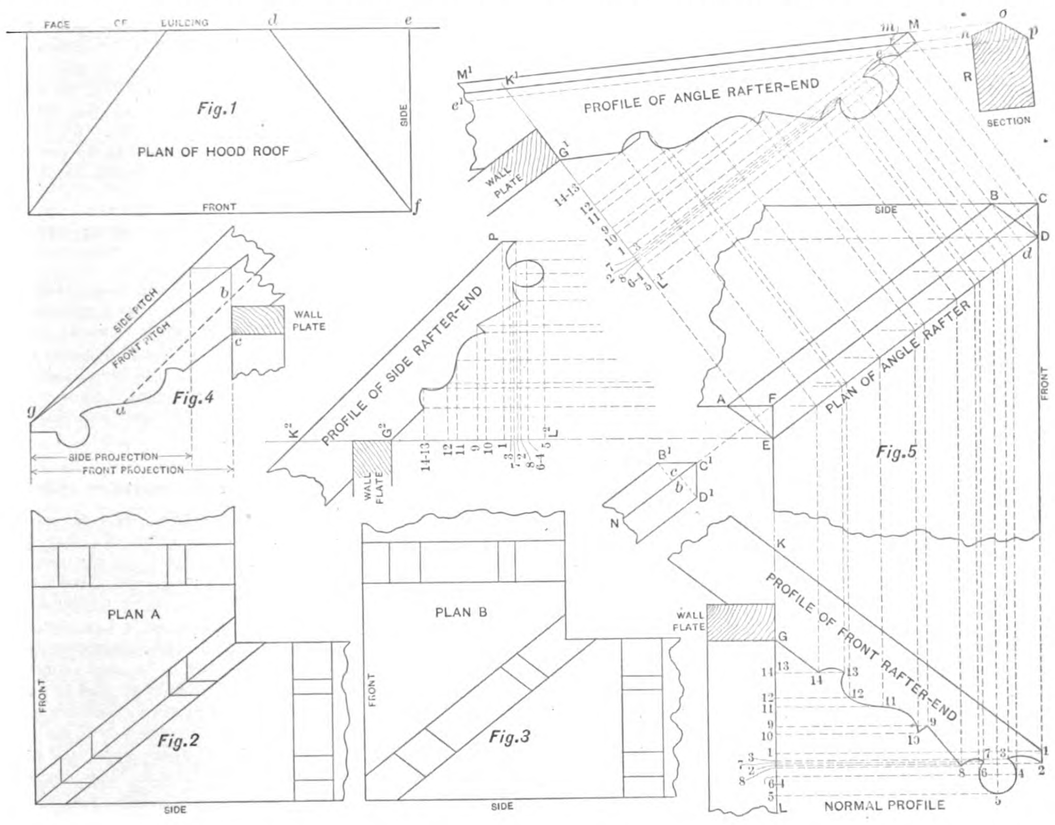
A Question in Rafters.—Sketch Submitted by L. H. Hand.

projection of the front and side the same, the wall plate for the sides be raised sufficiently to support the rafters, and that a wedge shaped piece of material be then added to the lower side of the side rafter, of sufficient size to permit its profile being made the same as that of the front rafter, all as shown by $a\ b\ c$. This may or may not, at the discretion of the builder, call for a false planceer to be placed in the side cornices following the line of the front pitch, all depending upon the amount of difference between the two pitches. The result of this operation will be to produce a regular miter (a miter line at 45 degrees) on the lower side of the cornice, and thus greatly simplify the raking operations necessary to developing the profile of the hip rafter end.

Though very unusual there is nothing inartistic in a design for a hood in which the side cornices have less projection than the front when this difference is the natural result of the differences in the pitches of the roofs. In such a case the wall plates, like the eaves, are on the same level all around, the hip rafter end follows the line of the hip and the whole presents a harmonious appearance.

We show in Fig. 5 a plan of a cornice in which the projection at the side is less than that of the front, with the profile of the front rafter end used as the normal profile; also the method of obtaining the profiles of the rafter end under the hips as well as that for the side of the hood and the section of the hip rafter which gives the backing, the hip rafter end being drawn as in plan A of our correspondent's diagrams. It is understood, of course, from the diagram, that the face of this rafter end hight of every point in the hip rafter end must be equal to that of its corresponding point in the normal profile, we may now measure these hights by carrying lines from each point of the normal profile horizontally to cut the line K I, which may be termed a line of hights. The spaces on K L are now transferred by any convenient means to the line erected from E of the plan as shown, making the line K¹ L¹ in every respect the same as K L, K¹ L¹ being the vertical line of the profile about to be developed. The position of the several points in the new profile may be found by carrying lines horizontally, that is, at right angles to K¹ L¹, to intersect lines of corresponding number which were erected from E D of the plan, all as shown from M to G¹.

This shape may be used as a pattern and applied, like the face mold of a winding hand rail, to the two sides of the material forming the half bracket or rafter end, shifting that for the inner surface of the half bracket horizontally forward, that is, in the direction of line 1 M,



Rafter-End Under Hip Between Roofs of Unequal Pitch.—Diagrams Showing How to Do the Work.

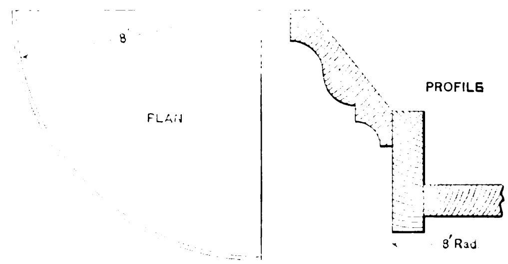
forms what is really a miter between moldings whose profiles are those of the adjacent normal or common rafter ends, and that it is therefore most conveniently made in two parts or halves. In fact the true side of the hip rafter end could be practically obtained by getting out a short length of molding whose profile is that of the normal rafter end, placing it in correct position in the miter box and then cutting it off at the angle of the plan.

In the plan, Fig. 5, A B C D E F represents the position of the hip rafter end. In beginning the work it will be advisable to first locate a number of points on the curved portions of the normal profile, as shown by 4, 5, 6, 11 and 12, and to number all angles in the profile as shown by the figures 1 to 14, inclusive. Lines from each point may now be carried into the plan as shown to intersect the line E D, representing the near side of the hip rafter. This gives the relative projection of each point from E toward D. Therefore lines may now be erected at right angles to E D into the space above preparatory to developing the side of the hip rafter end. Since the a distance equal to M *m*, which distance is obtained in this view by projection from the points C and D of the plan. It being understood that the wood is to be cut away on the face up to the lines on both sides, thus making the lines of the molding cross the face of each half bracket obliquely as shown in plan A. The horizontal distance between like points in the two sides for the other half of the bracket is shown by M *e*, which points are obtained from C and B of the plan.

In drawing the plan of the hip rafter, a choice of two methods may be taken, which have reference entirely to the appearance of the finished end. If the two side lines A B and D E are placed equidistant from the center line C F, as shown, the result is to make the spaces C B and C D unequal. If it be considered advisable, as a matter of appearance, to make the spaces C B and C D equal, the plan may be drawn as shown at N, in which B¹ C¹ is equal to C¹ D¹, with the consequent result that one part or half of the bracket must be cut from thinner material than the other. In this case the distances for shifting the pattern from the outer sides to make the inner, are indicated by C^1 *c* and C^1 *b*.

The backing for the hip or angle rafter will be found by constructing a section at right angles to the same as shown at R at the right. First complete the elevation of the hip rafter end by projecting the point C of the plan to intersect the line 1 M at M, and from M draw M M^1 which will show the amount of the backing for the rear side, that is the side shown by E D of the plan. The backing for the farther side (shown by A B in the plan) will be found in the same manner, that is, by projecting a line from the point B of the plan to cut 1 M of the elevation as shown at *e*, and then drawing the line *e* e^1, shown dotted, parallel to the pitch line of the hip rafter.

To construct the section at R, first extend all the lines of the elevation as shown at the right, across which at right angles draw three lines whose distances apart are the same as those separating the lines A B, F C and E D of the plan. The intersection of each of these lines with the three upper lines of the elevation as shown at *n*, *o* and *p* will give the angles of the backing, to which the bevel may be set. Had the plan of the hip rafter been



Setting Out a Splayed Crown Molding for Circular Cornice.

drawn as shown at N, the operation of constructing the elevation and the section R would have been exactly the same, but the results would have been different because the distances of B and D from C would then have been different.

We would call our correspondent's attention to the fact that, since the projection of the cornice at the side is less than that at the front it will also be necessary to develop a profile for the side rafter end, in which each point of the profile will necessarily remain at the same hight as corresponding points in the other two profiles but will be reduced in projection. Inasmuch as the profile of the hip rafter end has been obtained from that of the front by carrying lines parallel to the front cornice in plan to intersect the diagonal or miter line of the plan, so the profile of the side rafter end may be obtained, by simply reversing the operation, that is, by carrying lines parallel to the side cornice from points already obtained on the diagonal line, all as shown at the left in Fig. 5. Any line drawn at right angles across the plan of the side as 1 P may be assumed as a horizontal base line upon which the line of hights may be erected as shown by K^2 L^2 which is a duplicate of K L of the normal profile. From each point on K^2 L^2 lines are drawn horizontally (that is, at right angles to K^2 L^2) to intersect lines of corresponding number brought up from points on the side line of the plan of the hip rafter, all as shown. It may be remarked with regard to lines spoken of as being horizontal, that as K is the top of the normal profile so K^1 is the top of the profile of the hip rafter end and K^2 the top of the side rafter end, as indicated by the setting of the reference letters in each view; also that the profile of the side should properly be in line with the side A B of the plan, but since A B and E D are parallel, the result is the same as if obtained from points on A B, which saves transferring the points from E D to A B before beginning the development last described.

In constructing a hip rafter end as shown in plan B, it will of course be made in one piece of the full thickness of the hip rafter, setting the pattern on the side A B of the plan Fig. 5, horizontally back from its position on the side E D, a distance equal to D *d* (or to *c b* of the plan N, if the method of drawing the plan there shown has been adopted), thereby bringing the profile on each side in line with the profiles of the adjacent common rafter ends, but causing the moldings to cross the face at the angle shown by the lines D B and A E.

As the methods herein employed are those of descriptional geometry, that is, those used extensively by draftsmen, it will be necessary in order to make them available for use by the carpenter and builder that the drawings should be made full size of the work.

GEORGE W. KITTREDGE.

Setting Out a Splayed Crown Molding for Circular Cornice.

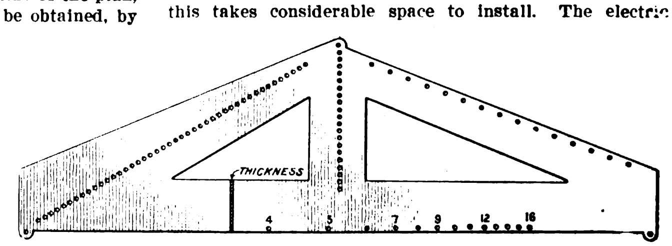
From W. I. H., Monroe, N. Y.—I would like some reader of *Carpentry and Building* to give a method of getting out a splayed crown molding for a circular cornice. The cornice is to be level and the molding the ordinary sprung crown molding as indicated by the sketch sent herewith. By reference to the plan view it will be seen that the radius is 8 ft. I have no doubt an answer to this inquiry will interest many others beside myself.

What Is the Instrument and for What Is It Used?

From S. B., Rome, N. Y.—Inclosed find a sketch of an instrument of which I shall be glad to have the readers tell me the name and for what purpose it is used. It is of metal of the thickness indicated on the sketch and has small holes through it as marked. It was found here in a lumber mill, but none of us can tell what it is or what use can be made of it. Will some of the practical readers kindly enlighten me.

Gasoline Engine for the Woodworking Shop.

From Paul T. Lesher, Philadelphia, Pa.—So much has recently been said about the use of small power for woodworking and carpenter shops that I am inclined to offer a few words on the subject. To my mind the most economical way to operate a workshop is by installing a gasoline engine for the motive power, as it has distinct advantages over the steam engine and electric motor. A steam engine must be run all day to be used economically, for it takes time and fuel to start it, and if only used periodically in a day it would be very expensive and inconvenient. The cost is further increased because the steam engine requires a boiler and other apparatus, and this takes considerable space to install. The electric



What Is the Instrument and for What Is It Used?—Scale, One-Half Full Size.

motor is handicapped in many localities where there is no power, or where there is power but is not available in the daytime, and in most localities where it is possible to secure the current the cost is so large that it cannot be used economically for a small shop.

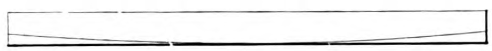
With the gasoline engine it is possible to install many labor saving machines which cannot be operated by hand, thereby increasing the capacity of the shop and the cost of turning out the work is very much lessened. It is a small and compact machine in comparison to the power it develops, being entirely complete in itself, and is always ready to start and can be instantly stopped.

A gasoline engine will run all the light machinery, such as saws, planers, &c., with little expense and trouble; in fact, a small shop requiring from 4 to 5 hp., running all day, will only require from 2 to 3 gal. of gasoline per day, and counting the cost of lubricating oil, the cost per day would only be about 30 to 40 cents. It is very easy to secure the gasoline, as it is sold in almost every locality since automobiles have come into general use.

The engine can be installed in any convenient corner and the gasoline can be bought as needed, or can be deposited in a storage tank outside the shop.

Weatherboarding a Circular Bay Window.

From M. C. W., San Jose, Cal.—I have for some time past thought I would send a few lines for the correspondence columns, not for the purpose of showing how



Weatherboarding a Circular Bay Window.—Method Suggested by M. C. W.

much (or how little, rather) I know, but because it does not seem to me to be right to take all and give naught in return. In reply to "M. C. H.," Atlantic City, N. J., I take it that he means the common beveled lap siding, so, in order to bring the bottom level or to the gauge mark on the board below, it will be necessary to round the bottom of the pieces of siding as shown in the sketch when sprung into place. Each piece will then be level. Just how much to round the piece can be ascertained by tacking on a strip at the center and springing down the ends to the wall and then marking the ends at the gauge marks, strike the arc of a circle from the points thus obtained and the bottom of the board in the center as shown in the second sketch. Cut away the lower part and the piece is ready to put on. It would perhaps be of advantage to make a template at the beginning as there are so many pieces to be used. The first board of course is not treated as described but put on in the regular way. The reason for treating the other pieces is that the bottom of the board has a radius larger by the thickness of the siding than the top which comes against the sheathing boards.

Comments on Cost of Silo Construction.

From H. Eells, Brandon, Wis.—I am one of the two correspondents who contributed data relative to silo construction on which was based the article appearing in a late issue of *Hoard's Dairyman* and reprinted in the June issue of *Carpentry and Building*. I have therefore observed with no little interest what your Chicago correspondent had to say touching some of the features of the work connected with the building of the 10-ft. silo referred to. In reply I would state that my silo is 10 ft. in diameter inside and 31 ft. deep, the walls being 6 in. thick, thus making nearly 20 yards of concrete. The $68.30 mentioned in the original article is the total cash paid for material, but does not include the work of building, &c. The work was not done by one man, as your correspondent infers. Most of the time I had a man to help me. The 41 days is the total number that it took to erect the silo, but does not include the work of digging the hole or drawing the gravel. It took 18 days' work for one man to dig the hole, and it was stone and gravel all the way down. The hole was dug 11 ft. in diameter and about 13 ft. deep and was graded up to 15 ft. after the silo was finished. The gravel was thrown out with a shovel. When the stable floor was reached it was thrown in there and taken out through the stable. The bottom of the silo is 7 ft. below the stable floor.

I think the statement of the Chicago correspondent that it required three men, a boy and a horse 41 days to dig a hole for a cistern 10 x 15 ft. more startling than anything in the silo article. He says the last item, "$9.70 for roof, door frames and doors is, to say the least, startling," so I will give the items:

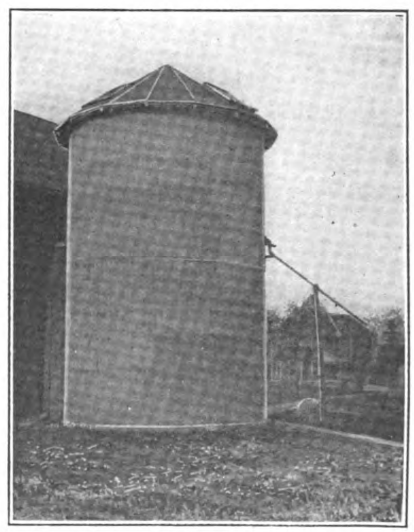
Roof, 16 2 x 4s, 7 ft. long, 75 ft. at $30 per 1000	$2.25
Roof boards, 150 ft. at $25 per 1000	3.75
150 sq. ft. two-ply felt roofing	1.24
Doors and door frames, 82 ft. at $30 per 1000	2.46
Total	$9.70

There are three doors 24 x 22 in. and one 5½ ft. by 22 in. The doors are two thicknesses of ⅞-in. stuff with paper between. The door frames are 2 x 6.

Nothing very startling here. Will do without the door frames in the next silo I build, and will make a "form" for the doors, so as to have no wood in the wall. The doors should set in the wall against a shoulder in the concrete allowing about ½ in. space around the door and when filling, fill this space with wet clay so as to be about like mortar and this will make the door airtight. This form was made in six sections held up while building the silo by one 2 x 4 to each section. All sections were bolted together. The "forms" were 3 ft. high so that about 2 ft. 9 in. of wall could be put in at a time. All work of putting concrete in the forms and tamping was done on a short plank laid on the circular pieces of the "forms" so that no other staging was needed.

These "forms" have been used in making 10 silos and are still in use. I built the first concrete silo in this part of Wisconsin three years ago. Have filled it now for the fourth time and it has given the best of satisfaction. I expect to build another the same size next summer using the same forms. I know of about 30 silos of different sizes built of concrete near my place and all are well pleased with them.

I am inclosing a photo of my silo so that the readers



Comments on Cost of Silo Construction.

of *Carpentry and Building* as well as the Chicago critic may see just what it looks like.

Music Cabinet in the Mission Style.

From H. C. L., Salt Lake City, Utah.—I have been taking your paper ever since the first of the year and would not be without it. I am at present in need of some information and therefore shall be much pleased to hear from the practical readers along the line indicated. I would like to have published drawings of a music cabinet built in the Mission style and of the following dimensions: 2 ft. 10 in. wide inside, 15 in. deep inside, and 5 ft. high over all.

Rendering a Cement Cellar Waterproof.

From W. S., Lima, Ind.—I have been a reader of *Carpentry and Building* for a number of years, but have failed to find anything in its columns on the subject of waterproofing cellars. I have one which has water in it during wet weather and would like to know of the practical readers if there is any preparation which I can use to coat over an old concrete wall and cellar bottom. If they do I shall be glad to have them tell me what it is and how to mix it. I have about 575 sq. ft. of surface over which the coating must be placed.

Universal Rule for Obtaining Lengths and Bevels of Hip Rafters

From C. H. B., Puyallup, Wash.—For some time past I have been a reader of *Carpentry and Building*, deriving a great deal of good from a perusal of its columns, and I desire at this time to make a request of the Editor, which if granted will confer a great favor upon me. It is that he re-publish in the Correspondence columns an article on rafter cutting which appeared seven or eight years ago. It was entitled I think the "Universal Rafter Rule." I was not a subscriber to the paper at that time and consequently did not get it, but I have no doubt the re-publication of the article will prove of value to many others than myself who are now subscribers, but who possibly were not at the time this particular article appeared.

Note.—In compliance with the request of our correspondent above we re-publish herewith article in question which appeared in the issue of March, 1900.

From L. W. G., Alpena, Mich.—Having given a reply to "W. S." of Paterson, N. J., in regard to a method of obtaining lengths and bevels of hip rafters where the hips were equal and the plan square, I will now give a rule which is universal, and can be applied to any plan.

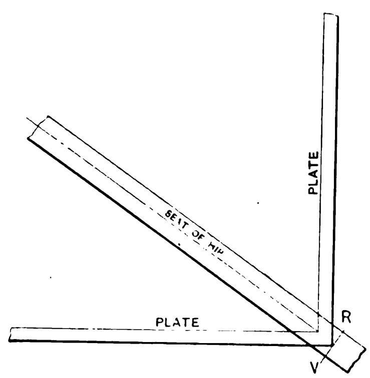


Fig. 1.—Plan of Corner of Building, Showing Seat of Hip Rafter.

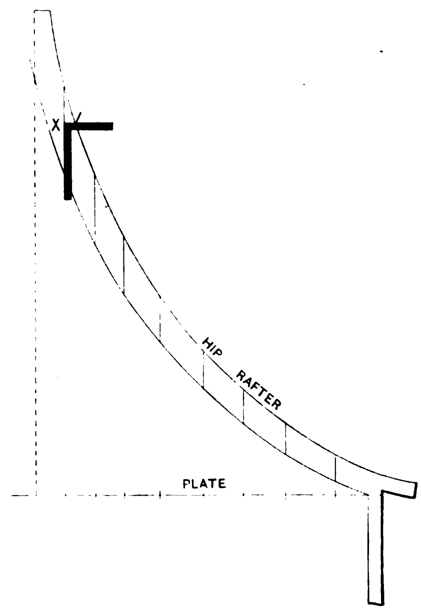


Fig. 2.—Showing Method Where the Hip Rafter Is Concave in Outline.

Universal Rule for Obtaining Lengths and Bevels of Hip Rafters.

whether square or not, and is adapted for any shape of rafter, be it straight, concave, convex or any other form. First make a plan of the corner on which the rafter is intended to rest, as in Fig. 1, and draw a line to represent the seat or run of the hip rafter. Be sure that the line of the seat thus made angles on the corner to correspond with the rail work. Next lay off one-half the thickness of the hip rafter each side of this line and square over from the seat line each way, as shown from R to V of Fig 1. Now lay out the hip rafter pattern by the common rafter rule, which I gave in connection with my reply to "W. S. W." in a previous issue, and which is no doubt understood by many, if not all, the readers.

Having the pattern completed with its plumb and level cuts, make plumb marks on the side of the pattern about a foot apart. Now, with the square to those marks, slide it up or down until the edge of the rafter coincides with the figure on the tongue of the square, which is the distance from V to the plate in Fig. 1. Prick off this distance as shown at X in Fig. 2. Do this at all the plumb marks, and then, setting a nail in the points thus made, a thin batten bent around them will give the line of bevel for that side, to be worked from the center of the rafter. If the hips do not angle equally it will, of course, be necessary to use the distance from R to the plate for that side. It will be noticed that the angle which the seat of the rafter makes with the corner of the plan gives the distance more or less at V and R of Fig. 1, which governs the bevel of the backing for that particular side. The hip rafter in Fig. 2 is shown concave in outline in order to demonstrate that the method gives the proper results whether the work be concave, convex, ogee or straight.

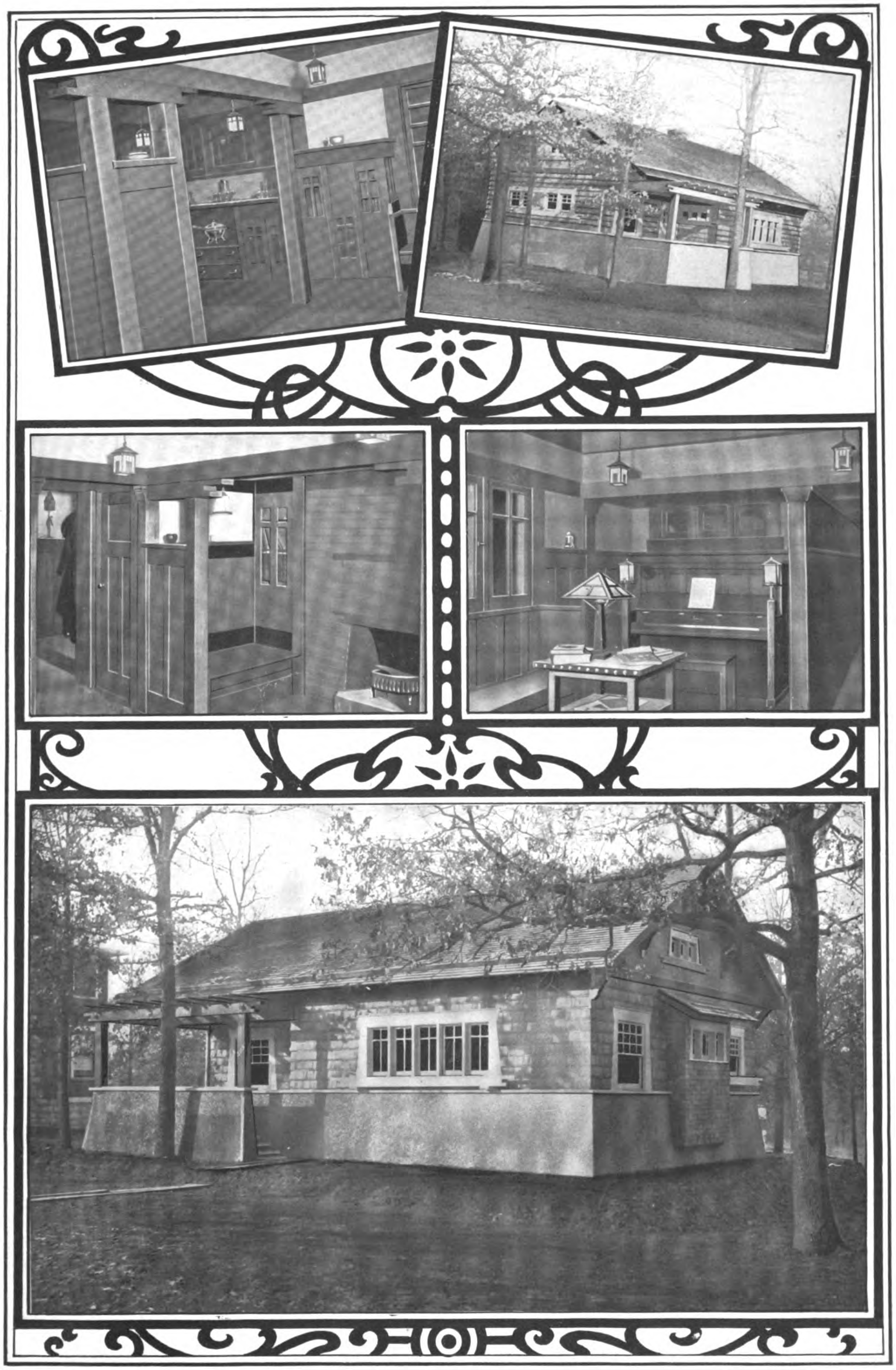
A New Word for Concrete Users.

From W. D. Browning, Collinwood, Ohio.—There is a growing tendency to call the larger particles that go into concrete with sand and cement, "aggregates," when in fact the whole mixture is the aggregate or sum. A very close study of the word fails to reveal any definition that would imply that it could be used as the name of an object, and since the broken stone, slag, cinder or other things put in with the cement and sand are objects, such a term that means the *whole* is out of place. Hence, I suggest the word *copard* to mean anything of a larger size that will be used in concrete with sand and cement.

Copards are the co-partners of the sand and cement to make up the aggregate or sum total which is the concrete, the word being used in a sentence something like this: "The copards in the concrete mixture were slag" or, "A washer for copards should be built near the source of supply." Or, if no new word is needed do not use "aggregate" as it is confusing and improper.

Attaching Corrugated Sheets to Iron Frame Buildings.

From E. C. H., Sykesville, Md.—I have a building 20 x 40 x 16 ft., of angle and tee iron frame, to be covered with corrugated iron, and not having had any experience would like to hear from those who have how to go about it. How are measurements taken for the holes in the iron frame, so that when the parts are put together they will come right and fit snugly? What is the best method of fastening the corrugated iron to the frame? Is riveting cheaper and better than the use of bolts? How are either applied or used? Are any special tools used, and is there any regular method followed which simplifies the work?



EXTERIOR AND INTERIOR VIEWS OF BUNGALOW ERECTED FOR M. KATHERINE MOORE,
AT WEBSTER GROVES, MO.

STANLEY H. MOORE, Architect

SOME PROBLEMS IN STAIRBUILDING.—XI.

BY MORRIS WILLIAMS.

A VERY common example of a stairway with a cylinder starting on a landing, the wreath winding around it from a level rail up to the rail of the flight adjoining, is illustrated in plan in Fig. 72 of the illustrations. Instead of having winders in the intersection between the second and third risers we have deemed it best to arrange a platform. In such a construction as this the first important course to pursue is to see to it that the risers are placed in and around the cylinder to the best advantage as regards facilitating the construction of the wreath, as well as securing a pleasing appearance to it when in position.

By placing risers 2 and 3 as shown at a distance from *d* equal to one-half the width of a tread the best possible arrangement of the risers is obtained, as will be explained when the elevation of the steps is drawn, as indicated in Fig. 74 measure to 6, the hight of three risers, and at 6 place the pitch board. Draw the pitch down over the steps, as shown, to *b'*, and from *b'* draw a level line to *a'* and beyond, to represent the center line of the level landing rail. In this manner we have obtained the length and pitch of each tangent required for the two face molds.

For the bottom wreath the two tangents thus found are shown at *a' b'* and *b' c'*. The tangent *a' b'* is shown to be level and the tangent *b' c'* to be inclined.

For the top wreath the tangents as shown at *c' d'* and *d' e'* are inclined equally and are of the same inclination as the tangent *b' c'* of the bottom wreath—a condition due to the necessity of jointing the two wreaths at the point *c'*, as shown in the figure.

One bevel only will be required to square the bottom

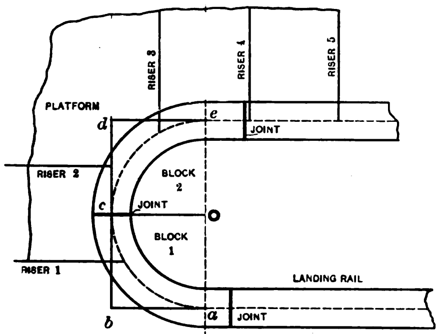


Fig. 72.—Plan of Cylinder and Steps Adjoining.

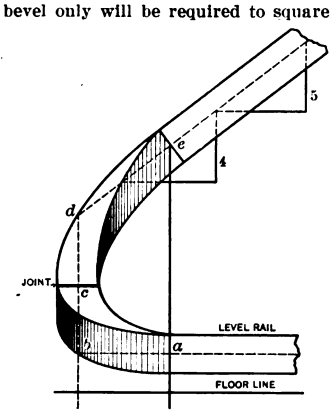


Fig. 73.—Vertical Projection of the Wreaths.

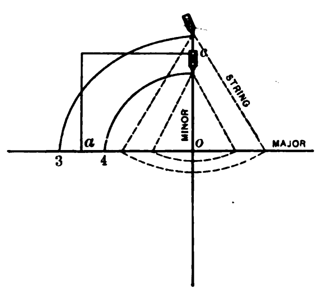


Fig. 75.—Face Mold for Bottom Wreath, the Curves Being Drawn by Means of Pins and String.

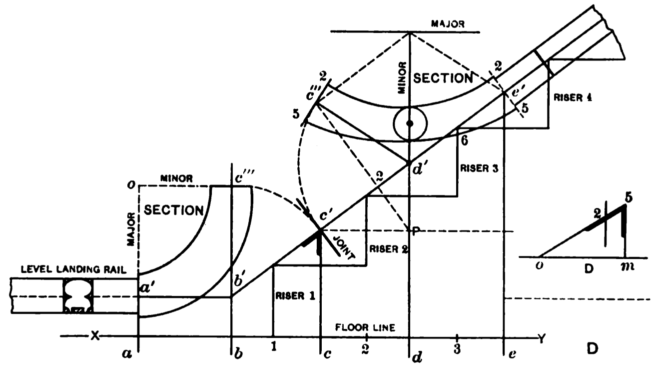


Fig. 74.—Showing Elevation of Steps, Pitch Line of Tangents and Face Molds.

Some Problems in Stairbuilding.—XI.

Fig. 74. It will be observed that the plan curve of the rail in Fig. 72 is drawn from the center O. The center joint of the wreaths will be at *c*.

The tangents are shown at *a b*, *b c*, *c d* and *d e*, forming two squares, which may be considered as bases of two square blocks similar to those represented in Figs. 35 and 39 in a previous issue.

The projection of the wreath is shown in Fig. 73, winding around the cylinder from the level landing up to the inclined rail of the adjoining flight, all reference letters in both figures corresponding.

In Fig. 74 is shown the elevation of the steps and tangents. Referring to the diagram, let X Y represent the floor line. Transfer to it the distances *a*, *b*, *c*, *d*, *e* to represent the stretchout of the plan tangents, shown at *a*, *b*, *c*, *d*, *e* of Fig. 72; also the points 1, 2 and 3 to represent the risers within the cylinder. Now from 3 in

wreath because only one tangent is inclined. It is shown at *c'* to be equal to the top angle of the pitch board and it is to be applied to the end *a'* only. Because the two tangents of the upper wreath are equally inclined, only one bevel will be required for this wreath also, but owing to the two tangents being inclined the bevel will have to be applied to both ends of the wreath. This bevel is found as shown in diagram D by making *o m* equal to the length of any of the plan tangents, or rather the radius of the cylinder; and *m* 5 equal to the length of the dotted line shown drawn square to the inclined tangent *c'-d'* from 2 to *p*, in the elevation Fig 74. By connecting 5 with *o* as shown the angle at 5 will define the required bevel.

The face molds for the two wreaths are shown in Fig. 74 constructed upon the pitch line of the tangents. For the purpose of constructing the bottom face mold place one leg of the compasses in the point b' and extend the other to c'. Revolve the point c' to c'' and connect c'' with b', which will be the inclined tangent as required upon the face mold. The level tangent of the mold will be the bevel line a' b', and the angle required upon the mold between the two to square the joint will be the right angle shown at b'.

Now draw a line from c'' to o and from o to a', forming the square of the section. The line c'' o will be the minor axis and o a' will be the major axis.

The curves of the mold are shown drawn with the string and pins in Fig. 75.

The face mold for the top wreath is laid out as shown in Fig. 74 by drawing a line from P to 2 and extending it to c''' square to the pitch line of the tangents. Now by placing one leg of the compasses in the point d' and extending the other to c' revolving the point c' to c''' as

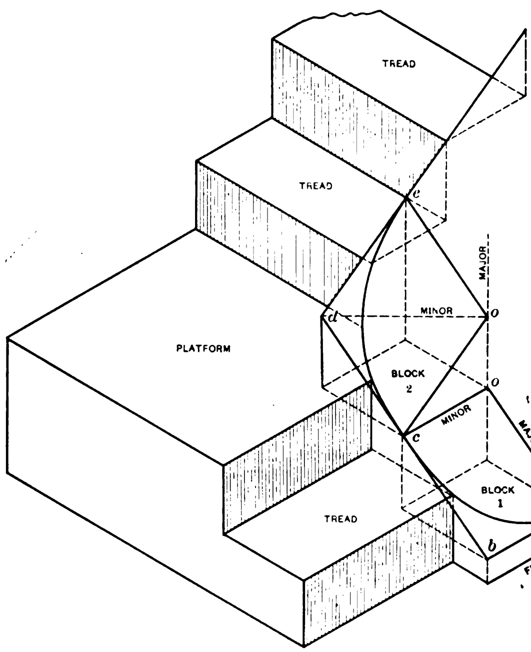


Fig. 76.—Isometric View of a Few Steps Within and Adjoining the Cylinder; the Sections Cut Through the Two Square Blocks; the Center Line of Wreath Lying on the Inclined Plane of Sections, Illustrating the Adaptability of the Operations to the Construction of Wreathed Handrails.

Some Problems in Stairbuilding.—XI.

shown and connecting c''' with d', the tangent c' d' will have been transferred into the face mold. The other tangent of the mold will be the line d' e'.

Now square the joints with the tangents at each end and determine the width by placing on each side of c''' and c' the distance 2 5 shown on the bevel in diagram D.

The width of the mold upon the minor axis will equal that of the plain rail. Now draw the curves with a lath or with string and pins by the methods shown in previous articles. It will be observed that in this example the plan of the cylinder as shown in Fig. 72 is a semicircular curve, and that the rail is made in two sections jointed together at c, the crown of the cylinder; also that the two quadrants of the center line of the rail are each inscribed within four straight lines made up of two tangents and two springing lines. The elevation of the two tangents of the upper quadrant are shown in Fig. 74 to be equally inclined.

Now if we consider the square marked block 2 in Fig. 72 as the base of a square block, and the inclination of the two tangents as shown in Fig. 74 to indicate the pitch of a section cut obliquely in two directions to its axis, we will have the same problem to solve as that demonstrated in Fig. 39 of a previous article.

Similarly if we consider the square marked block 1 as shown in Fig. 72 to be the base of a square block and the elevation of the bottom tangents a' b' and b' c' in Fig. 74 to indicate the pitch, a section is cut obliquely to one side of its axis, we are facing a problem of the same nature as the one demonstrated in Figs. 35 and 36 of the same article.

Having similar conditions it follows that similar solutions as in the figures demonstrated will apply to the formation of face molds for the wreaths over the cylinder shown in Fig. 72. In Fig. 76 this aspect of wreath construction is graphically illustrated. In this figure the steps contained in the cylinder are shown, also the square blocks 1 and 2, as well as the sectional cuts made through them to the pitch of the tangents shown in Fig. 74, the minor and major axes of each block, are also shown, and the center line of the two sections of the wreaths lying on the surface of the sectional cuts as shown from a through c to e. The forms of these sections are shown in Fig. 74 upon the face molds bearing the same reference letters as in Fig. 76.

It is obvious from what has been said and demonstrated that a knowledge of a method to solve the problems of unfolding a section of a solid block is all that is necessary to lay out a face mold.

"Plastic Models" of Modern Buildings at the 1915 Boston Exposition.

A special feature of the exhibits at the "1915" Boston Exposition in the Old Art Museum in November will be "plastic models" of local public works and buildings. Some of these reproductions will represent public buildings already completed, and others those still in prospect.

In the exhibit of "housing" under the direction of Philip Cabot, chairman of the Boston 1915 Housing Committee, it is purposed to construct a model which shall accurately reproduce on a small scale a particularly congested block of tenements which has been made the subject of special study by experts at work during the past summer under the direction of the committee. This will show the lack of air space, of lighting, sanitation, refuse in the areas and other features which call for remedy. As a contrast to these conditions it is planned to show a model of a small suburban farm homestead of a type which can be constructed at a low figure on land enough for farming on a small scale.

As a more vivid exhibit of tenement conditions, the housing committee has planned to have reproduced in actual size one of the poorest tenements now occupied in Boston. Beside this will be constructed a tenement suite of the best possible type which can be fitted out at moderate cost—one not beyond the earning capacity of the average worker.

Still another feature of this housing exhibit for which plans are now being made is a model of a new type of "adaptable" house, which is so designed that it can be turned to other uses at little expense, as the character of the neighborhood changes. The purpose of this exhibit is explained by Mr. Cabot by calling attention to the numbers of brick houses in the South End which were built for expensive residences, but which had greatly deteriorated in value by not being readily convertible into anything else.

Bonding Concrete.

Bonding new and old concrete can be accomplished in the following manner, according to Albert Moyer: "Clean the surface of the old concrete with clear water and a stiff broom. Apply a mixture of one part of hydrochloric acid and three parts of water with a brush, making several applications one after the other. Then scrub the surface with clean water and a stiff brush until all the acid is washed away and the surface is perfectly clean and free from loose particles. While it is still wet apply the fresh concrete, and keep the new concrete damp for at least a week, being careful not to allow it to become dry at any time."

WHAT BUILDERS ARE DOING.

WHILE there has been some falling off in the volume of operations as compared with a year ago, the character of the improvements for which permits have been issued in the city of Atlanta, Ga., is such as to call for a larger expenditure of capital. This shows that the operations are of a more pretentious nature than was the case last year, and this applies with equal force to the operations in August. According to the report of Inspector Ed. R. Hays, 399 permits were issued from his office in September for building improvements to cost $439,791, while in September last year 466 permits were issued for work estimated to cost $436,019.

For the three months ending September 30 of the current year 1034 permits were issued, calling for an estimated outlay of $1,208,960, whereas in the same quarter last year 1246 permits were issued for work estimated to cost $1,340,181.

For the nine months of the current year 3336 permits were issued from the office of Inspector of Buildings for improvements estimated to cost $4,225,071, these figures comparing with 3202 permits for improvements involving an outlay of $4,136,905 in the same months of last year.

Birmingham, Ala.

Prices of building materials are tending upward at the present time, although this fact does not appear to restrict operations to a noticeable extent. The work under way is divided in about equal proportions between private dwellings and business houses, but it is interesting to note that concrete is not being used to any great extent in the work.

The report of Building Inspector W. O. Matthews for the month of September shows quite a shrinkage in operations as compared with the same month last year. The total for the third quarter, however, is larger, as is also that for the nine months. The statistics available show that 115 permits were issued in September for new work estimated to cost $143,982, while in the same month last year 124 permits were taken out for work valued at $243,245.

For the third quarter of the year there were 351 permits issued with an estimated cost of $643,426, against 296 permits, with an estimated cost of $553,292 in the third quarter of 1908.

For the nine months of the current year the totals are 1064 permits and $1,918,486 estimated cost, while in the corresponding months of last year 832 permits were issued for work estimated to cost $1,638,243.

Buffalo, N. Y.

For the past month or two conditions in the building trades have assumed a little more normal and healthy aspect, and contractors are looking for a fairly busy fall and winter. There is a fair amount of work at present under way, being about equally divided between business blocks and private residences. Among prominent work in course of construction may be mentioned the Sidway Building, the addition to the Lafayette Hotel, the McArthur Estate Building, the Homeopathic Hospital, seminary buildings, several large school buildings and a big structure connected with the new water works. The best and largest job of concrete construction that has recently been put up in the city is that of the Homeopathic Hospital at Lafayette and Linwood avenues, the contractors being Metz Brothers, of this city, and George Newton, 6 Beacon street, Boston, Mass., the architect.

According to the figures compiled in the office of Deputy Building Commissioner Henry Rumrill, Jr., there were 908 permits issued for building improvements in the third quarter of the current year, estimated to cost $2,769,000, as compared with 778 permits for work, involving an estimated outlay of $2,099,000 in the corresponding quarter of last year.

For the nine months of the current year the total footed up 2657 permits, with an estimated cost of $7,165,000, and in the first nine months of last year 2116 permits, with an estimated cost of $4,909,000.

Chicago, Ill.

No better evidence of the country's substantial development is needed than is shown in the marvelous growth of building construction as exhibited in the monthly tabulation of building permits issued in the various cities. In Chicago the degree of activity thus indicated in this industry is most encouraging. Leading by a fair margin all other cities in the list for the month of September, its own previous high record established in 1908 has already been passed, with the results of three more months yet to be added.

Permits in the nine months of this year ending September 30 were issued for 8893 buildings with 241,209 ft. frontage, costing $70,105,230, as against 8171 buildings, 214,911 ft. frontage, costing $45,779,065, for the same period of 1908, in which year a total cost of $68,694,768 for 12 months was reached, being $1,410,462 less than that represented by the permits granted up to September 30 of the present year.

Decisive gains were shown in September, 1909, over the same month last year, as may be seen from the following comparison: September, 1909, there were 957 buildings with 26,880 ft. frontage and costing $7,720,500, against 950 buildings, with 25,279 ft. frontage and costing $5,147,350, in September, 1908.

Conditions seem entirely favorable to a continuance of activity in the building trades. Prevalence of fair weather has stimulated outside construction and much new work is being started. Practically all labor controversies have been settled and the outlook in all directions is unclouded by fear of complications that might arrest the present prosperous march of events.

Cincinnati, Ohio.

In this field the building trades have been astonishingly active since the first of the year, but largely on dwelling and apartment house construction. The era of heavy construction was last year, when a number of skyscrapers and power buildings as well as new schoolhouses were built. Four-fifths of these were of reinforced concrete construction, a style of building that has been developed to a greater extent here than in other large cities of the West or Central West.

For the first nine months of 1909 the number of permits issued by the Building Inspector was 6204, as compared with 4471 for the same period of 1908. The estimated cost of these improvements was $6,567,709, as against $4,701,813 for the preceding year, indicating an increase for the period of about 30 per cent. The three months constituting the third quarter of 1909, compared with the same period of 1908, shows up considerably better. In 1909 about 35 per cent. more permits were issued, but aggregating almost 50 per cent more in value.

Following are given the figures showing building in Cincinnati for the first nine months of 1909 compared with the same period of 1908:

	1908.		1909.	
	No.	Cost.	No.	Cost.
January	189	$90,690	366	$297,780
February	164	407,020	485	476,450
March	599	428,340	704	914,675
April	618	621,943	753	965,765
May	606	425,530	671	807,260
June	653	896,125	832	481,665
July	562	814,710	740	830,430
August	479	561,210	840	1,150,234
September	601	456,245	804	643,450

One of the largest structures to be built in the Central West of concrete construction is under way in Cincinnati—viz., the $500,000 building for the Ohio Mechanics' Institute, in memory of the late Thomas Emery of that city, the largest realty holder in the Central States. As yet concrete is used for residence construction only in a small way, but the smaller business building of whatever nature is largely built of this material. The building for the Home of the Incurables, just started, will be of brick, steel and concrete and will cost about $20,000. The new building of the Hennegan Printing Company, to cost $30,000, is also under way. One of the handsomest and most unique church structures in the country has been designed by Architect S. F. Beman. It will be located in aristocratic Walnut Hills, Cincinnati; will be of brick and fancy stone and cost $60,000.

Contractors as a rule comment on the cheapness of material, saying most items are lower than last year, and this is stimulating building among those in modest circumstances.

Cleveland, Ohio.

More building permits were issued in this city during September than in August, although the total estimated cost of the buildings for which permits were granted shows a falling off as compared with the previous month. During September there were issued by the city Building Inspector 592 permits for buildings to cost $814,405, compared with 552 permits issued during August for buildings to cost $1,092,130. The figures show that the average cost of the new buildings for which permits were granted during the month has fallen off considerably. This is largely explained by the fact that nearly all the larger work planned for this season was under way and permits were secured before September. A very satisfactory amount of new work in the way of medium priced dwelling houses continues to come out and builders expect that this, with the large amount of work now under way, will keep them busy well up into winter. There is a general feeling that the cost of building will be higher next year and this is stimulating activity in the erection of dwelling houses this fall.

The members of the Carpenter Contractors' Association had an outing and clambake on September 23 at Maple Cliff

Villa. The members met at the Builders' Exchange at 3 o'clock in the afternoon and reached their destination in automobiles, provided by fellow members, some time later. A baseball game was the feature of the afternoon's sports. Later a dinner was served, and following the feast of good things there was story telling and songs by different members of the company.

Columbus, Ohio.

There has been a perceptible increase in the amount of improvement work projected in the building line in the last few months, the record for September being in excess of that for either August or July. In fact, there are only three months of the present year when the estimated cost of the improvements for which permits were issued was in excess of the figures for September. The bulk of building operations in the city consists of dwelling houses, the high prices of materials entering into building construction not seeming to have affected prospective operations to any noticeable extent. Concrete is being used more largely than heretofore in the erection of buildings, and no doubt its popularity will continue to grow as its merits become more widely recognized.

The report of Inspector of Buildings R. A. Edgar for September shows 177 permits to have been issued for improvements value at $377,855, as against 163 permits in September last year for improvements valued at $322,925. For the third quarter of the current year the totals foot up 455 permits for new buildings valued at $907,695, while in the third quarter of 1908 there were 459 permits issued for improvements valued at $1,019,510.

For the nine months of the present year the totals are in excess of those for the corresponding period of 1908, the figures being respectively 1439 permits, valued at $2,948,996, and 1344 permits, valued at $2,719,428.

Denver, Colo.

There has been a slight falling off in the volume of building operations as compared with this season last year, although the decrease is not at all significant as the record thus far this year is appreciably ahead of the first nine months of 1908. According to the report of Building Inspector R. Willson there were 255 permits issued in September for buildings estimated to cost $869,490, while in the same month last year 285 permits were issued for work involving an estimated outlay of $1,006,625. Of the work projected last month mention may be made of 108 brick residences to cost $289,000, six apartment buildings to cost $146,000, three terraces to cost $18,000 and 14 business buildings to cost $271,000.

The record for the nine months of this year shows 2616 permits to have been issued for new buildings, alterations and repairs involving an outlay of $9,200,563, while in the corresponding months of 1908 there were 2390 permits issued valued at $7,563,320.

Detroit, Mich.

That the city is forging ahead in the erection of dwellings and business buildings is evident from the figures compiled by Building Inspector Frank W. Claxton, which showed for the nine months a total almost equal to the entire 12 months of 1908. Probably three-fourths of the operations have related to dwelling houses, the remainder being buildings intended for business purposes. An interesting feature is the extent to which concrete blocks are being used, more particularly in connection with dwellings, and reinforced concrete for business buildings.

The figures for September show a slight falling off as compared with a year ago, although the change is not particularly marked. There were 392 permits issued for new work to cost $1,078,970, and in the same month last year 329 permits for buildings valued at $1,193,150.

For the nine months of the current year the value of the improvements for which permits were issued was $10,250,810, as compared with a valuation of $8,373,250 for the first nine months of last year, and $10,682,170 for the entire 12 months of last year.

Hartford, Conn.

The demand for dwelling houses in and about this city has been such as to cause the erection of a large number of buildings of this character, and, in fact, they constitute a large percentage of the operations this season. Prices of building materials are about the same as last year, although there is a slight hardening tendency which may develop into a quotable change of figures if the present volume of work continues. The cost of construction, however, has not had any appreciable effect upon prospective building operations, and in the opinion of Fred J. Bliss, Building Inspector, the outlook is for an increased volume of work during the coming year.

According to the authority mentioned there were issued during July, August and September of the current year 208 permits for building improvements costing $849,570. This, however, is somewhat less than for the same months last year, when 172 permits were issued calling for an estimated outlay of $1,559, 330.

For the first nine months of this year 632 permits were issued from the office of Building Inspector Bliss for work to cost $2,517,819, while in the same nine months of last year 490 permits were taken out for building improvements to cost $2,473,215.

Indianapolis, Ind

The figures given out from the office of the Building Inspector covering the month of September indicate an almost complete change in the construction work in the city during the past year, due to the increasing popularity of fireproof buildings. The figures show that in September last year the permits issued for fireproof construction amounted to only $5000, while for September this year they amount to $278,000. The permits issued for non-fireproof buildings amounted to $40,635, as against $64,400 in September last year. The total value of the improvements for which permits were issued last month was $712,775, as compared with $512,336 in September, 1908. There was a decrease in the amount of capital invested in dwelling houses as compared with a year ago, the figures being $289,235 and $333,465, respectively.

For the nine months ending September 30, 1909 the total value of building improvements projected was $5,935,955, and for the corresponding period last year $4,838,555.

Houston, Texas.

The month just closed was a record breaker so far as building operations were concerned, the estimated cost of building improvements for which permits were issued being the greatest ever known in a single month in the history of the city. The engineer's office issued 58 permanent permits, representing a value of $1,302,260, and 57 repair and remodeling permits, amounting to $19,950, making a total of $1,322,210. The previous record was for November, 1908, when 110 permits were issued calling for an outlay of $938,694.

The largest permit issued in September was for the $600,000 terminal station and the next largest was for the 16-story office building to cost $500,000. Concrete is being used to some extent, as may be noted from the fact that a permit was issued for a four-story concrete warehouse to cost $60,000 and for a two-story concrete building to cost $38,000. Of the 58 permanent permits issued 51 were for dwelling houses.

Kansas City, Mo.

As the season draws rapidly to a close there is naturally a cessation of the tremendous activity which has characterized building undertakings during recent months of the year. This is shown in a somewhat marked degree in the report of Superintendent John T. Neil of the Building Department for the month of September, when permits were issued for improvements estimated to cost $1,021,345, as against $1,356,910 in September last year. Of the total for last month $474,200 was for brick construction and $462,550 for frame buildings, the remainder being made up of miscellaneous work.

For the nine months of the current year brick construction called for an outlay of $4,788,350, frame buildings $5,028,850 and miscellaneous construction $999,243, making a total of $10,816,443. In the corresponding months of last year the total estimated outlay for brick construction was $3,808,100, for frame buildings $3,587,977 and for miscellaneous construction $999,706, making a total of $8,395,783.

Los Angeles, Cal.

While building has fallen off slightly in Los Angeles during the last month, as shown by the records of permits issued, contracting builders report that they are still about as busy as they can be and that they note no falling off in the amount of work actually under way. During September 837 permits were issued, with a total valuation of $1,375,909, as compared with 750 permits, with a total valuation of $1,555,199, for the month of August, and with 656 permits, showing a total valuation of $849,703, for the month of September last year.

Of the new work authorized during September $423,672 represents one-story frame construction, $87,132 represents one-and-one-half-story frame construction, $232,176 two-story frame construction, $30,000 three-story frame construction, $103,000 class A steel frame buildings, $72,000 class A reinforced concrete building, $120,720 class C construction, $163,000 reinforced concrete additions and the remainder miscellaneous work.

Louisville, Ky.

As might naturally be expected at this season of the year there is a slight falling off in the amount of building work, but it is to be noted that the shrinkage brings the figures a trifle under the corresponding quarter of last year, when business generally was at a comparatively low ebb. During July, August and September of the current year 780 permits were issued from the office of Inspector of Buildings Marshall Morris, calling for an estimated outlay of $978,773, while in the corresponding quarter of 1908 there were 829 permits issued for building improvements to cost $1,055,695. The bulk of the operations is made up of houses for dwelling purposes, although of course more or less is being done in the business sections, where concrete construction is more or less of a feature.

In the first nine months of this year the Inspector issued 2371 permits for new buildings, alterations and repairs calling for an outlay of $2,471,138. In the same months of last year 2348 permits were issued for work estimated to cost $2,312,549.

Memphis, Tenn.

An interesting feature of the local building situation is a six-story reinforced concrete loft building which is now under way and which with the six-story reinforced concrete structure for the Y. M. C. A. gives this form of construction a good representation as a starter. Last month most all the buildings projected were private dwellings, although the plans are out for a 20-story structure to be erected at the corner of Second and Madison streets. The contract will be let in about 60 days. There is also under way an 18-story building, of which Hale & Rogers are the architects and N. M. Woods the resident architect. The builders are Mearth Brothers. The American Snuff Company and the Memphis Water Company have just completed buildings of a character which add material to the total cost of building operations for the season.

During the third quarter of the current year there were issued from the office of Building Commissioner Dan. C. Newton 689 permits for new buildings, alterations and repairs, involving an estimated outlay of $1,102,795. In the same three months of last year 710 permits were taken out for improvements estimated to cost $986,280.

For the first nine months of the current year the commissioner issued 1241 permits for building operations estimated to cost $2,845,066, while in the corresponding period of last year 1254 permits were issued, involving an outlay of $2,620,555.

Milwaukee, Wis.

About 50 per cent. of the total valuation of building construction during the current year represents structures designed for business purposes, the balance being made up of flats, dwelling houses, &c. While the prices of building materials have remained practically unchanged, the cost of labor has increased in several branches of the building trades, but this has not been sufficient to check prospective operations to any appreciable extent.

For the months of July, August and September of this year 1257 permits were issued from the office of Edward V. Koch, Inspector of Buildings, calling for an estimated outlay of $3,287,229, while in the corresponding months of last year 1220 permits were taken out for work estimated to cost $2,945,453.

That this rate of construction work has been fairly well maintained throughout the current year is evidenced from the fact that for the first nine months 3400 permits were issued for building improvements to cost $9,092,241, as compared with 3377 permits for improvements costing $7,110,974 in the first nine months of last year.

Minneapolis, Minn.

Probably one of the most notable features of the building situation in this city is the extent to which fireproof construction is being erected. A large amount of it is of reinforced concrete and the material is being used extensively in the form of concrete blocks, both hollow and solid, for dwelling houses and their foundations, and also in connection with structures designed for business purposes. According to James G. Houghton $2,626,000 was expended in fireproof construction during the first nine months of the present year, as against $1,451,000 during the entire 12 months of 1908; in fact, about 26 per cent. of all the expenditures in building operations thus far the present year has gone into fireproof construction.

During the quarter ending September 30 the Department of Buildings issued 1715 permits for improvements estimated to cost $3,439,680, as against 1625 permits, estimated to cost $3,089,035, during the corresponding quarter of 1908.

For the first nine months of this year 4832 permits were issued for building improvements involving an estimated outlay of $10,145,020, while in the corresponding nine months of last year 4462 permits were issued for improvements estimated to cost $7,457,360.

Prices of building materials are showing a slight upward tendency at the present time, and the cost of building does not appear to have had any restraining influence on prospective operations.

Nashville, Tenn.

The members of the Nashville Builders' Exchange celebrated the first anniversary of the organization on the evening of September 17 with appropriate ceremonies. President R. T. Creighton occupied the chair and in well chosen words reviewed the history of the organization since it began its career a year ago. It started with but 10 members and now has 117. The original president of the organization, H. W. Buttorff, sent sincere regrets at his physical inability to be present. M. E. Purcell, a builder of Chicago, complimented the membership upon the work of the organization and pointed out some of the advantages resulting from such a body as the exchange had proved to be. Other speakers included John A. Jones, Joseph H. Peter, A. J. Dyer, Howard Jones, J. V. Johnson, D. A. Dickey, John E. Bouchard, T. B. Agerton and Humphrey Hardison.

The occasion was one of general rejoicing and the serious side was touched but lightly in passing. The one hint of pathos was perhaps given by the address of retiring Secretary and Assistant Treasurer Haynes McFadden, who heartily thanked the members for the support given him and said he would answer any call the exchange might make upon him in future, even though his home should be in another city.

On September 22 Thomas H. Evans was elected secretary of the exchange to succeed Mr. McFadden, who was about removing to Atlanta, Ga. Mr. Evans is well known as a contractor and recently held the office of Building Inspector.

The exchange will move into its new quarters in the Noel Block on January 1, 1910. The rooms include a large assembly hall and several offices.

New Haven, Conn.

A pretty good idea of the extent to which dwelling and tenement houses are being erected in this city may be gained from the statement that out of an estimated outlay of $2,581,421 for building improvements for the first nine months, $1,661,126 was for houses of the character mentioned. Concrete work is not being used to any appreciable extent in connection with dwelling houses, although concrete blocks are used in many cases for the foundation walls above grade.

In the third quarter of the current year 268 permits were issued from the office of the Building Inspector, to cost $985,610, and in the same months last year 262 permits were issued calling for an outlay of $824,915.

For the nine months of the current year 803 permits were issued for buildings to cost $2,581,421, and in the first nine months of last year 673 permits were taken out for improvements estimated to cost $1,934,235.

New York City.

The local building situation in September showed about the same degree of activity as was the case at this season last year, the only noticeable difference being a very slight increase in the number and value of the projected improvements. As compared with August, however, there has been a very heavy shrinkage, the number of permits being more than cut in half and the estimated cost falling fully $5,000,000. In the Borough of Manhattan permits were taken out in September for 59 new buildings to cost $4,660,700, while in the same month last year permits were issued for 49 buildings to cost $4,449,200.

In the Borough of the Bronx, where a great deal of activity has prevailed in the way of houses for dwelling purposes, permits were issued for 125 new buildings costing $1,938,175, as against 198 new building, to cost $1,888,250, in September last year.

In Brooklyn the vast amount of improvement work in the outlying districts, in the shape of the erection of two-family houses and other dwellings, is reflected in the permits issued in September for 948 new buildings to cost $5,331,400, as compared with 819 new buildings, costing $4,837,523, in September last year. From these figures it will be seen that in spite of the great disparity between the boroughs of Brooklyn and Manhattan as regards projected structures the Borough of Manhattan has a total valuation of $670,700 less than the former, but this is not to be wondered at, as the cost of individual buildings in Manhattan is always in excess of that of either the Boroughs of the Bronx or Brooklyn.

In the Borough of Queens new buildings were projected in September to the value of $1,669,120, which is a slight falling off compared with $1,928,842 for September last year.

For the nine months of the calendar year ending September 30 the cost of the improvements with the number of permits issued in four of the five boroughs constituting Greater New York are as follows:

	1909.		1908.	
	Permits.	Cost.	Permits.	Cost.
Manhattan	817	$106,395,468	491	$58,955,271
Bronx	1,872	29,846,485	1,305	11,931,585
Brooklyn	5,544	45,940,556	4,243	25,296,553
Queens	3,425	12,710,000	3,896	9,119,000

From the above it will be seen that the total number of permits issued in these boroughs for the period stated was 11,658 and the value of the improvements projected $195,532,509, these figures comparing with 9935 permits for building improvements estimated to cost $105,302,409 in the corresponding months of last year.

Oakland, Cal.

The building permits issued in this city during September reached a total of $367,820, a falling off as compared with the unusually large total of $547,836 for the month preceding, but about up to the average for the previous months of the year. Building both in the city proper and in the suburban cities and towns promises to continue active throughout the fall and winter. The Bankers' Hotel, the construction of which was held over last year, is now to be built. Last week plans were placed in the hands of a number of contractors and bids will be called for shortly. The estimated cost of this structure is $700,000. The Young Men's Christian Association has applied for a permit for a four-story reinforced brick and concrete building at Telegraph avenue and Twenty-first street, to cost about $200,000.

Omaha, Neb.

It is interesting to note in reviewing the building situation of the city that reinforced concrete has been used to an appreciable extent, principally, however, in connection with warehouse work. A great many of the permits which have been issued called for large business buildings, both stores and warehouses, although the bulk of the operations tend toward private dwellings. The short supply of brick has caused an advancing tendency in the price of that commodity, but outside of this the cost of building materials does not differ from last year.

In September there was a slight increase in the volume of building operations as compared with the same month last year, although there was a very heavy falling off from the August figures and also those of July of this year.

For the third quarter of the current year the value of the improvements for which permits were issued was $2,050,920, these figures comparing with $1,535,565 for the same quarter a year ago.

For the nine months of the current year the volume of operations not only exceeds the total for the corresponding period of 1908, but is slightly more than $1,000,000 ahead of the entire 12 months of last year, the figures being $5,594,280 and $3,274,015, respectively. The total for the 12 months of 1908 was $4,590,650.

Peoria, Ill.

Concrete work is coming into use quite liberally in the city in connection with residence construction, and is also being used to an appreciable extent for foundations of large work. It is safe to say that fully 75 per cent. of the operations relate to dwellings, for which there seems to be a constantly increasing demand and builders are kept on the go to supply it. The cost of building materials is showing a slightly increasing tendency, but this is not surprising as prices have been at a rather low ebb in this section for the past two or three years, with competition pretty keen.

In the third quarter of the present year the value of building improvements was $397,170, and for the nine months the figures are $1,189,445, as against $945,252 in the corresponding months of 1908. On the last day of last year a permit was issued for a 12-story steel structure estimated to cost $675,000, so that for the current year it is scarcely probable that the total will exceed that of a year ago.

Philadelphia, Pa.

Building operations in this territory are at the top notch. All previous records have been broken by the figures shown for work begun during the first nine months of the year, while those for the month of September have been exceeded but once in the history of the Bureau of Building Inspection, and that was in 1907. During the nine months ending September 30 statistics available show that the total estimated expenditure authorized was $34,865,760, comprising 13,850 operations, as compared with $21,249,840 as the estimated cost for 10,583 operations during the same period in 1908. For the same period during the heretofore record year, that of 1906, the number of operations for which permits were taken out was 14,327, the estimated cost being $32,292,250, so that so far this year we show a net gain of $2,573,510 over that of the previous best year. The total amount expended for building work during the whole year of 1906 was $40,711,510, so that with still three months' work before us we are now but $5,845,750 behind the total expenditures for that year, and which, judging from the volume of projected work, will no doubt be considerably exceeded.

The total for the current year is made up largely by a steady increase in the building of dwellings, for which there is apparently a constantly growing demand. During the first nine months of the year the number of two, three and four story dwellings for which permits have been taken was 7988, costing approximately $18,000,000. It is also interesting to note the increased number and largely increased individual cost of flat houses, which seem to be gaining in popularity. During the first nine months of last year the expenditure in that direction was $491,500 for 19 buildings, while for the same period this year the cost was $901,500 for 27 operations.

The statistics of the bureau show that during the month of September 765 permits were issued for 1438 operations, the estimated cost of which was $2,734,540. As has been the custom heretofore, the largest separate total for the month was for two-story dwelling houses, the erection of 767 being started, the approximate cost of which was $1,466,675, an increase of slightly over $300,000 when compared with the previous month.

The outlook for further extensive development of small dwelling houses, particularly in the somewhat outlying districts of the city, is quite favorable. Builders in a number of instances state their intentions of going ahead during the winter months on some fair sized operations, while the purchase of a block of ground in West Philadelphia, on which the erection of 86 dwellings will be started, has recently been announced. The erection of a number of municipal buildings is being considered and the Board of Education has asked for $4,000,000, in addition to the funds for work already provided, for the erection of school buildings.

Labor conditions are generally satisfactory in the building trades, although in many lines there is a scarcity of mechanics, but as the fall season advances this situation will no doubt show some improvement.

Murrell Dobbins, prominent in the affairs of the Philadelphia Master Builders' Exchange, who is a candidate for City Treasurer of that city, was given a complimentary dinner by his associates in the exchange, at the Majestic Hotel, on October 7. W. S. P. Shields acted as toastmaster. About 150 covers were laid.

Portland, Ore.

For the past four months there has been a steady increase in the value of building operations and September figures run well over the million and a quarter mark. The significance of this statement is found in the fact that the million-dollar mark has not been exceeded but three times previously the current year, and this was in February, April and May. The bulk of the operations this year consists of dwelling houses, and for business structures reinforced concrete is becoming quite popular in the city. Building Inspector G. E. Dobson is of the opinion that this form of construction has a great future in his section of the country.

Figures compiled in his office show that in September 509 permits were issued for building improvements calling for an estimated outlay of $1,288,300, as against 445 permits for buildings to cost $972,355 in September last year. For the third quarter of the current year 1388 permits were issued for buildings valued at $3,196,215, and in the third quarter of last year 1316 permits were issued for buildings to cost $2,783,116.

The record for the nine months of the current year shows a less number of permits issued than for the same time last year, but the capital invested is very much greater, signifying a more pretentious character of buildings this year than a year ago. The figures thus far for 1909 show 3625 permits for buildings calling for an estimated outlay of $9,501,650, as against 3906 permits for buildings to cost $7,670,726 in the first nine months of last year.

Portland, Me.

The estimated cost of the buildings which are now in course of construction in the city is about $2,500,000, and in this total must be included the new City Hall. Thus far the present year 307 permits have been issued from the office of Inspector S. D. Lincoln of the Building Department, two-thirds of which have been for new work, and this is about one-third larger than for the corresponding period last year.

The operations for the most part have covered dwelling houses, although there has been more or less doing in the business section, where a considerable portion of the structures have been of reinforced concrete and steel. The prices of building materials remain about the same as a year ago.

Richmond, Va.

Here, as in other cities, a vast amount of work has been and is being done in the way of erecting dwelling houses, for which there is an active demand. It is fair to state that the larger portion of the building work that is under way consists of work of this character. Concrete has been used to a very limited extent in the construction of private residences, and there are several large buildings, including an apartment house and a warehouse, which have been built of reinforced concrete. Building Inspector H. P. Beck is of the opinion that the volume of operations for the year will undoubtedly show an increase over 1908, which up to that time was the largest in the history of the city.

The permits issued in September from the office of the Building Inspector were 78, calling for an outlay of $233,871, which is an increase, as compared with September last year, of $94,890.

For the first nine months of the year 1042 permits were issued for new buildings, alterations and repairs involving an estimated outlay of $2,683,357. These figures compare with 805 permits for work involving an outlay of $2,298,624 in the first nine months of last year.

San Francisco, Cal.

Although there are many medium and some high class building plans in the hands of the architects and promised for the near future, the month has not been prolific of contracts or permits of the heavier type. The valuation of the permits issued during September reached a total of only $1,785,611 and the contracts recorded amounted to only $1,845,152, both being considerably less than in recent months. The permits issued during the month preceding reached a total of $2,186,064, and for the month of September, 1908, a total of $3,799,543. Building and material men claim to be doing well, and apparently there are few idle men in the building trades. The work under way is, however very largely on contracts let some time ago. General business conditions are favorable and banks are lending quite freely for building purposes. Contractors expect a fairly active season.

The San Francisco Board of Public Works has given notice to all owners of wooden buildings erected in the city for temporary purposes immediately after the big fire of April, 1906, that these buildings must be removed prior to May 10, 1910, or be torn down by the Board of Public Works at the expense of the owners. These buildings were erected without authority, but with the tacit permission of the city authorities, with the understanding that they would be allowed to stand for at least two years. Their removal will leave a number of vacant building lots in the heart of the business district, and these will undoubtedly be covered with permanent structures at an early date as they are too valuable to be allowed to remain unoccupied.

The advisory committee appointed a year ago to consider the revision of the city building law made its report last week, says our correspondent writing under date of October 5. The revised ordinance contains more than 50,000 words, but the greater part of this is a duplication of the present ordinance. Some important changes have, however, been suggested. Class A buildings are subdivided into two classes, the first including all class A buildings in which the wall loads above the third story are carried on the steel frames and the second subdivision including all class A buildings in which the walls are self-supporting. The first subdivision is unlimited as to hight, but the latter is limited to 86 ft. All class A buildings are to be of incombustible materials throughout, as heretofore.

Class B buildings are to remain practically as at present, including all buildings built of incombustible materials throughout which are without steel frames or otherwise not up to the requirements of class A. These are limited in hight to 102 ft.

Class C buildings, including buildings with incombustible outside walls but with wooden framework, are to be limited in hight to 75 ft. for buildings with metal lathing and studding and to 55 ft. buildings in which wooden lathing and studding are used. In the existing law all class C buildings are permitted to reach a hight of 84 ft.

In frame buildings the proposed ordinance reduces the hight from 45 to 40 ft., not over three stories, and a basement to be provided for in this hight. On sloping ground the hight is to be measured from the front, provided that at no point is the actual hight over 50 ft.

Mill construction buildings may be erected to a hight of 75 ft., the outer walls being of masonry and the supporting frames of heavy timber, with no concealed air spaces in the walls.

The provisions regulating the tensile strength of Portland cement are made more stringent.

Salt Lake City, Utah.

Concrete construction seems to be growing in popularity in this city to an astonishing degree, and it is to be noted that a great deal of work of this character is being done in comparison with the amount of buildings erected. This, of course, refers more especially to structures intended for business and manufacturing purposes.

The amount of capital called for by the permits issued in September from the office of A. B. Hirth, Inspector of Buildings, was $817,100, although only 77 permits were issued. In September last year 117 permits were taken out, but the estimated cost of the work was only $317,015, thus showing that the present work projected is of a decidedly more pretentious character than was the case a year ago. Then, it will be recalled, much of the work was in the nature of small buildings, repairs, alterations, &c.

The contrast between the amount of work done thus far the present year with a year ago is decidedly striking, the increase being a trifle over 100 per cent. According to Inspector Hirth the value of building improvements from January 1 to September 30, inclusive, was $6,043,420, whereas in the corresponding period of 1908 the value was $2,918,020.

The prices of building materials are not sufficiently high to have had any appreciable effect in the way of retarding building operations, and the increase this year over last has been due to the steady and heavy growth of the city. It is interesting to note that 1908 was by far the largest building year the city has enjoyed, and this speaks volumes for the figures for 1909.

Seattle, Wash.

A somewhat better class of buildings as compared with a year ago has been the feature of the local situation during September, as evidenced by the report of Superintendent of Buildings Francis W. Grant. His figures show that 1319 permits were taken out in that month for new work and alterations estimated to cost $1,740,390, while in the same month last year 1498 permits were issued by the department calling for an estimated outlay of $1,104,631. Of current operations 286 permits were for frame residences costing $598,935 and 339 permits were for wooden buildings for business purposes costing $99,670. There were 17 permits for brick construction involving an outlay of $649,500 and four were for reinforced concrete construction estimated to cost $166,500.

For the first nine months of the year the department issued 11,439 permits for building improvements estimated to cost $15,310,110, which figures compare with 9987 permits for improvements valued at $9,044,809 in the corresponding months of last year.

St. Louis, Mo.

Prominent architects of the city, builders and real estate men were the guests of the Building Industries Association at the reception given in honor of the opening of the permanent exhibit of building materials on the afternoon of September 23. O. G. Selden, president, and Frank Choisel, secretary, headed the Reception Committee. Refreshments were served and souvenirs in the form of a handsome booklet illustrated with photographs of the exhibits were given out. President Selden made a short address in which he dwelt upon the variety and quality of the building materials in St. Louis, and E. J. Russell, architect, pointed out that the exhibit would prove of great value to the members of his profession, as it would enable them to bring clients to the rooms and show them exactly how the various materials would look when in place. He predicted that the architects of the city would make liberal use of the exhibit. Superintendent Lewis Gustafson of the David Ranken, Jr., School of Mechanical Trades, also made a few remarks, in which he referred to the benefits that would accrue from the exhibit.

Building operations in September were about 20 per cent. larger than was the case in the same month last year.

St. Paul, Minn.

With a trifle less number of permits issued in September than was the case in the same month last year the amount of capital invested in building operations is far ahead of what was the case a year ago. This would indicate that a much better class of building was now being put up, and that a less amount of money was being expended in alterations and repairs. All indications seem to point to a total investment for 1909 of something over $10,000,000, and, if this should prove to be the case, the year will be a record breaker in building improvements.

The report of John G. Cunningham, City Building Inspector, shows that in September 326 permits were issued for new work involving an estimated outlay of $1,036,716, while in the same month last year 348 permits were taken out for work valued at $766,892.

The total number of permits issued for improvements during the first nine months of this year was 3320, to cost $8,632,767, while in the same months last year 2427 permits were issued for work estimated to cost $5,116,769.

Syracuse, N. Y.

While there was a slight falling off in building operations in September, it was not particularly significant, as the total for the third quarter of the year was considerably ahead of the same months in 1908. The bulk of the operations has been in the nature of dwellings, although business structures have not been altogether neglected. Concrete buildings are not being erected to any appreciable extent, although the material is growing in popularity and with the decreasing supply of timber it will naturally cut more of a figure in the future than in the past.

Last month building permits were issued from the office of Inspector J. W. Wickes for improvements, estimated to cost $391,085, as against $418,305 in September last year. For the third quarter of the current year, the value of the improvements was $1,282,020, while in the same period last year it was $1,040,920.

The most pronounced difference, however, is found when the figures for the nine months of the two years named are considered. From January 1 to September 30 of the current year the value of the improvements for which permits were issued in the city was $3,887,046, while in the corresponding period last year the value was $2,559,145.

Trenton, N. J.

There has been quite a boom in the erection of dwellings in this city for some time past, mostly of brick construction and very little of concrete. While the fiscal year of the building department ends with February, statistics are available showing how operations the third quarter compare with the same months in 1908. In September there was a decided increase in the value of the work projected as compared with any previous month in the year, and the contrast with September, 1908, is even more marked. The figures furnished by Assistant Building Inspector Edward B. G. Hancock show that last month 72 permits were issued covering 125 buildings estimated to cost $406,303, while in September, 1908, there were 64 permits issued covering 98 buildings costing $129,836.

For the third quarter of the year there were 229 permits issued covering 388 buildings estimated to cost $919,107, while in the corresponding quarter of last year 175 permits were issued for 246 buildings costing $348,484.

From these figures it will be seen that there has been a decided increase in the amount of building that is going on in the city, and the outlook is for a continuance of the activity now in progress.

Toledo, Ohio.

The building outlook in this city is considered very bright at the present time, and although a major portion of the operations under way involve dwelling houses, there have been several good commercial structures erected this year. "Poured" concrete is being used to a considerable extent for cellar walls and foundations for dwellings, with concrete blocks for the walls of the superstructure. In commercial buildings reinforced concrete is taking the lead over steel frame construction.

According to the records of the Department of Building Inspection—Joseph McMahon, chief—there were 363 permits issued in the third quarter of this year for improvements, valued at $697,021, as against 328 permits for improvements, valued at $723,711, in the corresponding quarter of last year. For the first nine months of this year 1054 permits were issued for new buildings, valued at $2,592,-220, these figures comparing with 815 permits for building improvements, valued at $1,594,083, in the first nine months of last year.

While the third quarter this year shows a decrease as compared with the corresponding quarter of last year, there is a substantial increase for the first nine months of 1909. The larger figures for the third quarter a year ago is due to extensive repairs to school buildings in July and August.

Toronto, Can.

The city has been witnessing a very gratifying degree of activity in the building line this season, and the aggregate of operations is largely in excess of that of 1908. In September there were 522 permits issued from the office of Robert McCallum, City Architect and Superintendent of Buildings, covering new work of an approximate value of $1,046,065. In the same month last year 463 permits were issued, the approximate value of the buildings being $1,109,530.

It is, however, in the figures for the nine months of the two years in question that the difference is most marked. For the current year 3767 permits were issued for building improvements of an approximate value of $13,054,677, while in the corresponding nine months of last year 2953 permits were taken out for buildings having an approximate valuation of $8,618,010.

The improvements during the year have been very general, including quite a number of large structures designed for business purposes, many of them being of reinforced concrete construction.

Youngstown, Ohio.

There are about 500 dwellings now in course of construction in the city, and the demand is such that there are few if any vacant houses to be had. Concrete is taking the place of lumber in a number of dwellings and business structures, and, while prices of building materials are tending upward, operations have not been restricted to any great extent. There are a number of large buildings under construction, including the County Court House and Public Library, the Masonic Temple, the First National Bank Building, a 12-story office building and a government building, together with a number of smaller structures.

September was a fairly active month, so far as the number of permits issued was concerned, although the total cost was not quite up to the same month last year. According to figures compiled in the office of Building Inspector Charles C. Knox there were 121 permits issued last month for improvements estimated to cost $208,655, while in the same month last year 55 permits were taken out for improvements to cost $241,200.

For the third quarter of the current year 373 permits were issued, involving an estimated outlay of $775,415, while in the corresponding quarter of 1908 there were 191 permits issued for new work, valued at $558,385. For the nine months of the current year 841 permits were issued for improvements estimated to cost $1,862,046.

LAW IN THE BUILDING TRADES.

BY A. L. H. STREET.

WAIVER OF BUILDING CONTRACT PROVISIONS—EXCUSES FOR DELAYS.

A builder's contract provided for the construction of a building under the direction of an architect as the agent of the owner, and further provided that no alterations should be made in the work as described by the plans and specifications, except upon the written order of the architect, and that extra work would be paid for only when the price had been agreed upon and affixed to the order given by the architect in writing and countersigned by the owner previous to the performance of the same. Held that the architect alone could not by verbal agreement waive this provision of the contract. A clause in such a contract, providing for a written demand by the builder for additional time in which to complete the building is legal, but may be waived by the owner entering into supplemental contracts for extras which require additional time for the completion of the building. Unless otherwise provided in the contract, a builder is not entitled to additional time because he has been delayed in the construction work by ordinary rains, for such might reasonably have been contemplated when the contract was made; nor is he entitled to additional time for delays caused by accidents or unexpected conditions against which he could have provided in his contract. (Nebraska Supreme Court: Carter *vs.* Root, 121 Northwestern Reporter, 952.)

RIGHTS UNDER BUILDING CONTRACTS.

Where a building contractor, with the knowledge and consent of the owner, and under direction of the architect, but without a written order, performs extra work entailing additional expense, he will not be precluded from recovering reasonable compensation therefor by a clause in the contract providing that no alteration shall be made in the work done or described by the drawings and specifications except upon a written order from the architect. Where the parties have acted upon and construed a contract, in the absence of any mistake or misunderstanding between them the court will enforce the contract as so interpreted. Where a contract requires a building to be erected by a specified time the naked promise of the owner to waive the time clause, made without consideration, is invalid, and the owner is not thereby estopped to claim damages for such delay when it does not appear that the contractor acted upon the promise. Such promise will, however, estop the owner from insisting upon a stipulation of the contract which provided that no allowance shall be made for delays caused by the owner unless a claim therefor is presented in writing to the architect. (Nebraska Supreme Court; Jobst *vs.* Hayden Brothers, 121 Northwestern Reporter, 957.)

PAYMENT OF DISPUTED CLAIMS.

Where one owes a fixed sum, the payment or tender of a less sum, accompanied by the statement that it is in full, accepted by the creditor, does defeat a collection of the balance; there being no consideration for the surrender of the balance, but where the parties do not agree on the amount of the debt, and the debtor tenders a less sum than is claimed by the creditor in satisfaction, and the creditor accepts it, the obligation is discharged. The right to name the terms on which a tender by a debtor in payment of a disputed claim shall be accepted rests alone with the debtor, and the creditor must either accept the tender with the conditions attached or reject it. A material man sold lumber to a contractor subject to inspection and acceptance by the engineer of the owner. A part of the lumber delivered was rejected by the engineer after the same had been put into the building, and the contractor threw the same aside, and notified the material man of the rejection. A dispute arose as to the liability of the contractor for the rejected lumber, and he sent a check to the material man for the amount which he claimed was due in settlement. The material man accepted the check. Held that the payment settled the claim. (Kentucky Court of Appeals; Cunningham *vs.* Standard Construction Company, 119 Southwestern Reporter 765.)

ARCHITECT'S RIGHT TO COMPENSATION.

Where one, ignorant of the rule that drawings and specifications are the property of the architect, employed an architect to prepare plans for the alterations of a building, the architect could not recover for his services without a delivery of the drawings. Where an architect, employed to prepare plans for a building, insisted that the plans were his property and refused to deliver them, the fact that there had been a prior delivery only for the purpose of inspection, followed by a return of the drawings to the architect, and the fact that the architect had been told to keep the plans until a future time, did not establish a waiver of a delivery, essential to a recovery for the services. (New York Supreme Court, Appellate Term) Hill *vs.* Sheffield, 117 New York Supplement 98.

EFFECT OF NONPERFORMANCE OF BUILDING CONTRACT.

Where a building contractor abandoned the work, leaving a substantial part thereof uncompleted, so that the owner was required to expend more than the balance due the contractor to finish the uncompleted portion, the owner was not liable for work and material furnished by the subcontractor. New York Supreme Court, Appellate Term; Schumer *vs.* Kohn, 117 New York Supplement, 770, 771.)

A SYSTEM OF CHURCH HEATING AND VENTILATION.

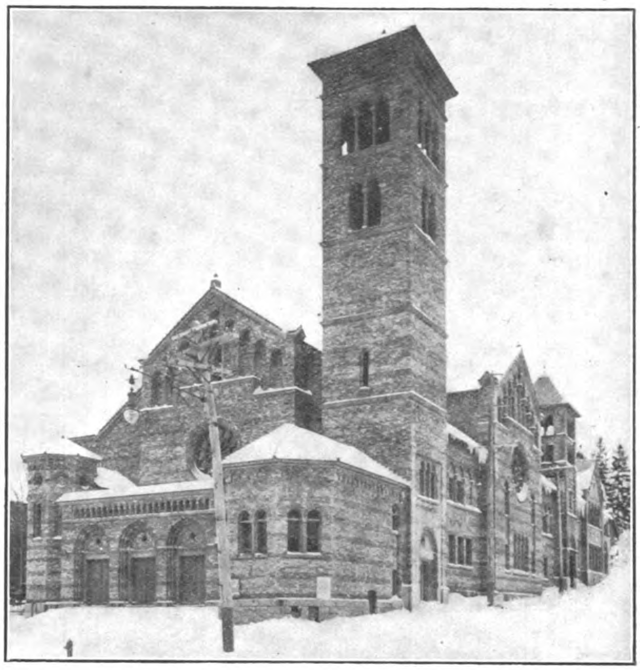
AN unusually interesting system of heating and ventilation which is notable for its simplicity and for an arrangement which obviates the heat losses which might have been entailed if the original layout of the system had prevailed, has lately been installed in a church building in Montreal. As now provided the system includes indirect steam radiation capable of warming the building in severe weather with gravity circulation, but augmented by a centrifugal fan which insures a positive flow of air at times when the ventilation is paramount or when quick warming may be desired. The outflow of the air from the building is provided for by an arrangement of small air passages under the floor of the auditorium, these passages serving numerous small registers in the auditorium floor and communicating with a large duct, which discharges into a vent shaft warmed to a greater or less extent by an adjoining smoke flue. When the church is unoccupied an internal circulation of air may be set up, openings toward the rear part of the auditorium in the floor communicating with passages below and allowing the air to recirculate through the indirect radiation, with or without the fan in operation.

The general proportions of the building and the requirements of the heating system are indicated in the accompanying drawings and the photograph of the exterior. It will be noted that the drawings include two different plans of the heating layout, one being the scheme as originally suggested and the other being the arrangement of the heating and ventilating engineer, W. M. Mackay, New York City. The church was erected from plans of Hutchinson & Wood, Montreal, and the heating and ventilating plant was installed by Alexander Mackay & Co., Dorchester and St. Mathew streets, Montreal.

The basement or cellar is unexcavated, and it was early decided to run air passages of masonry construction in excavations made for the purpose along the two side walls and along the front wall of the unexcavated part. The original layout, however, comprehended the use of a fan at all times drawing air over indirect coils and driving the warm air through the subterranean passages and thence to different flues for distribution of the air to the desired points in the auditorium. The carriage of warm air through a masonry passage surrounded by earth would naturally mean the loss of heat into the ground, as the apparatus will only be used one day each week; so Mr. Mackay, on being called in to the work, determined on having all the heating surfaces at the base of the different flues and employing the subterranean passage for conducting the cold air only. While the use of the fan was maintained, it was kept as a means of insuring a high degree of ventilation in mild weather and in summer, as well as in severe winter weather, leaving the plant to work in severe times as a gravity job, which would not be possible under the original arrangement, with the heating surface outside of the fan.

The temperature of the earth underneath the church will naturally be considerably higher than the average winter air temperature, so that the present scheme has the additional advantage that the air is warmed partially from a source which means no expense from the standpoint of the coal pile. Further, as will be noted, the steam and return mains for supplying the different indirect stacks are carried within the air passages, and they are not covered, but are depended on in part to temper the air before it reaches the stacks. The piping being radiating surface of no mean capacity, as well as conduits for carrying steam to the indirect radiation, are unusually large when viewed from the requirements of the indirect stacks alone.

The original design called for a tubular boiler which in part was to supply the steam necessary to drive a steam engine connected with the blowing fan, and a pump for the return of the water; instead of this arrangement, which might involve the services of a more carefully trained man than would otherwise be necessary, a sectional cast iron steam heating boiler was installed, the driving of the fan is accomplished by the use of an electric motor, and the condensation is returned by gravity. In the case of the first layout it was expected that the entrance could be sufficiently warmed by the plenum air supply, while in the plant as installed no dependence is placed on having the warm air within the auditorium work to offset any chilling blasts coming through the entrance; instead direct radiation is furnished sufficiently large in amount to heat the entrance and thus prevent any cooling of the auditorium when the air is unavoidably forced in on the opening of doors.



View of Church as Reproduced from a Photograph.

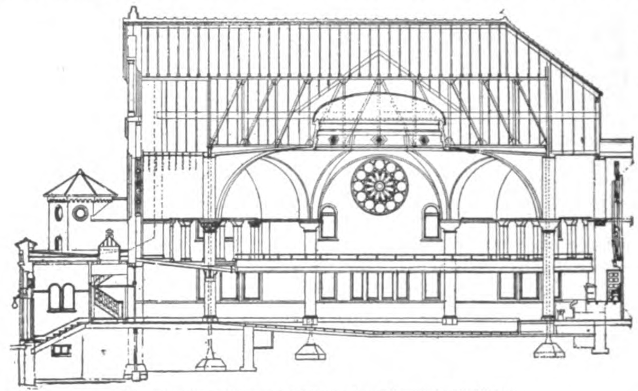
A System of Church Heating and Ventilation.

For purposes of ready calculation, it is assumed that the front wall of the church, on account of the entrance portico and towers, particularly in view of the use of direct radiation in the entrance, is not subjected to the severe outside temperature, but, instead, that the transmission of heat is about half what it would be if it were directly exposed. The two side walls, however, are direct exposed walls, and an estimate is also made of the heat loss through the ceiling of the church.

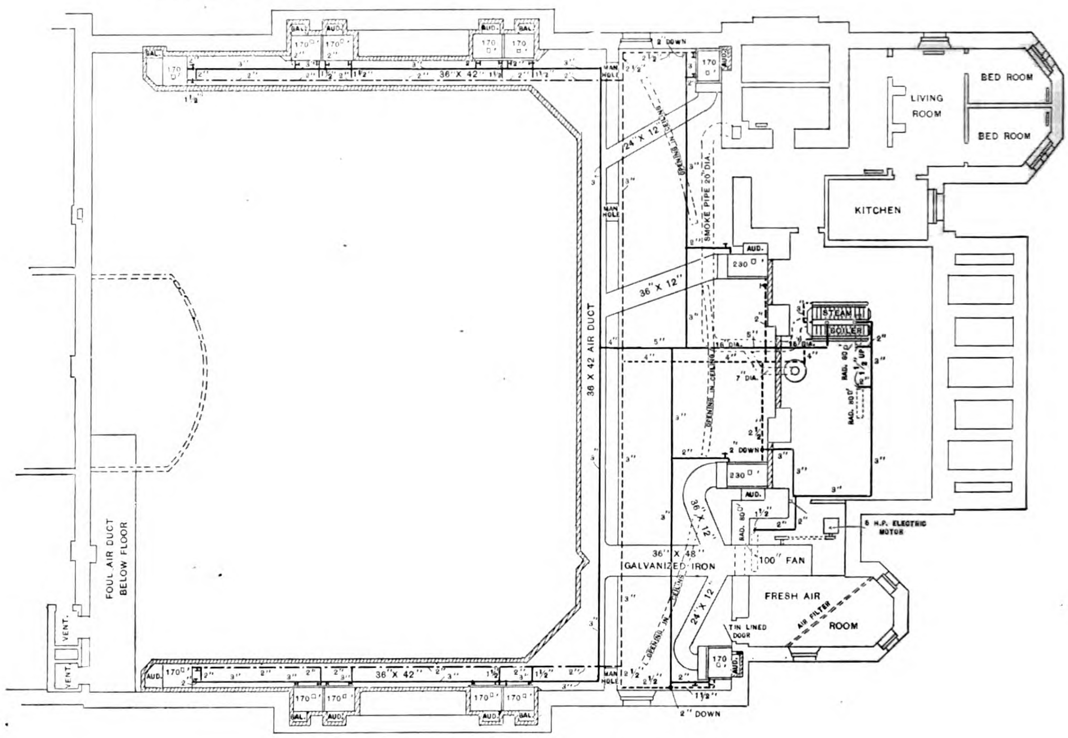
Roughly the church auditorium is about 86 x 88 ft. in plan, with a mean hight of about 34 ft. There is no transmission through the rear wall of the church, as on the other side of it is the Sunday school building, warmed by a separate hot water installation. Each side wall and the front wall has an area of about 3000 sq. ft. The plant is designed to operate when it is 10 degrees below zero, so that the range of temperature to which the wall is subjected is 80 degrees, and consequently instead of 85 heat units per hour per square foot of glass, the transmission through the glass is about $\frac{80}{70} \times 85 = 97$ B.t.u. per hour. Considering the walls as averaging 16 in. in thickness, the heat transmission through the wall proper is about 22 B.t.u. About one-seventh of the entire wall surface is glass, so that the loss of heat per average square foot of the exposed wall surface is $1/7 \times 97 + 6/7 \times 22 = 33$ B.t.u. per square foot per hour. The 6000 sq. ft. represented in the two side walls thus transmit hourly 198,000 B.t.u. At half the rate of heat transmission the front wall loses $3000 \times 17 = 51{,}000$ B.t.u. The ceiling may be regarded as losing about one-twentieth as much heat as if entirely of glass, so that the 7500 sq. ft. of ceiling represents the loss of about 34,000 B.t.u. The total hourly heat loss in extremely cold weather is thus 283,000 B.t.u.

With the indirect radiation assembled so that there is a chance for a greater amount of air to flow than desired in residence heating, in order to cater to ventilation requirements, it is safe to calculate that each square foot of indirect steam radiation warming the air from 10 degrees below zero to 110 degrees above can give off 400 heat units per square foot. Warming the required amount of air from minus 10 degrees to 70 degrees may be regarded as that chargeable to ventilation, inasmuch as it does not help to offset the transmission losses. The amount of heat represented in warming the air from 70 to 110 may, however, be regarded as that corresponding to the heat counteracting the exposed wall losses. From the time the air leaves the indirect stacks until its entrance into the auditorium there may be a loss of, say, 5 degrees, so that the air on beginning its circulation through the auditorium averages about 105 degrees. In the cooling from 105 degrees to 70, or through 35 degrees, must the heat for transmission losses be obtained. Therefore, of the 400 heat units available from each square foot of indirect stack 35/120 is available for offsetting the transmission losses, or about 117 heat units. Therefore the total number of square feet of radiation needed is equal to $283{,}000 \div 117 = 2420$ sq. ft.

In placing the radiation we note that the two side walls show a transmission of 198,000 heat units and the front wall about 51,000 heat units, or a total hourly transmission through the walls of 249,000 heat units. This indicates that 1 sq. ft. of indirect radiation is needed for about 100 heat units lost through the wall surface. Dividing 51,000 heat units for the front wall by 100 shows that about 510 sq. ft. should be arranged somewhere along the wall, and that about 1980 should be divided for the two side walls, or 990 for each side wall. There has actually been provided 1020 sq. ft. along each side against the 990 shown as necessary, but part of this is located in the corner between the side wall and the front wall, so



Longitudinal Sectional Elevation Through Building.



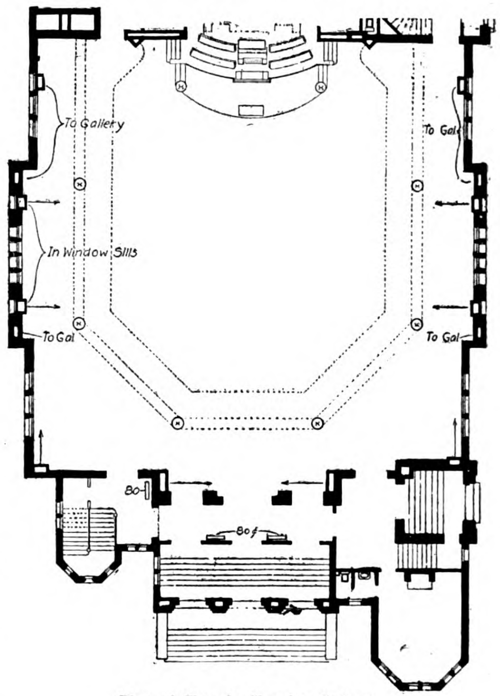
Plan Showing Heating System as Installed.

A System of Church Heating and Ventilation.

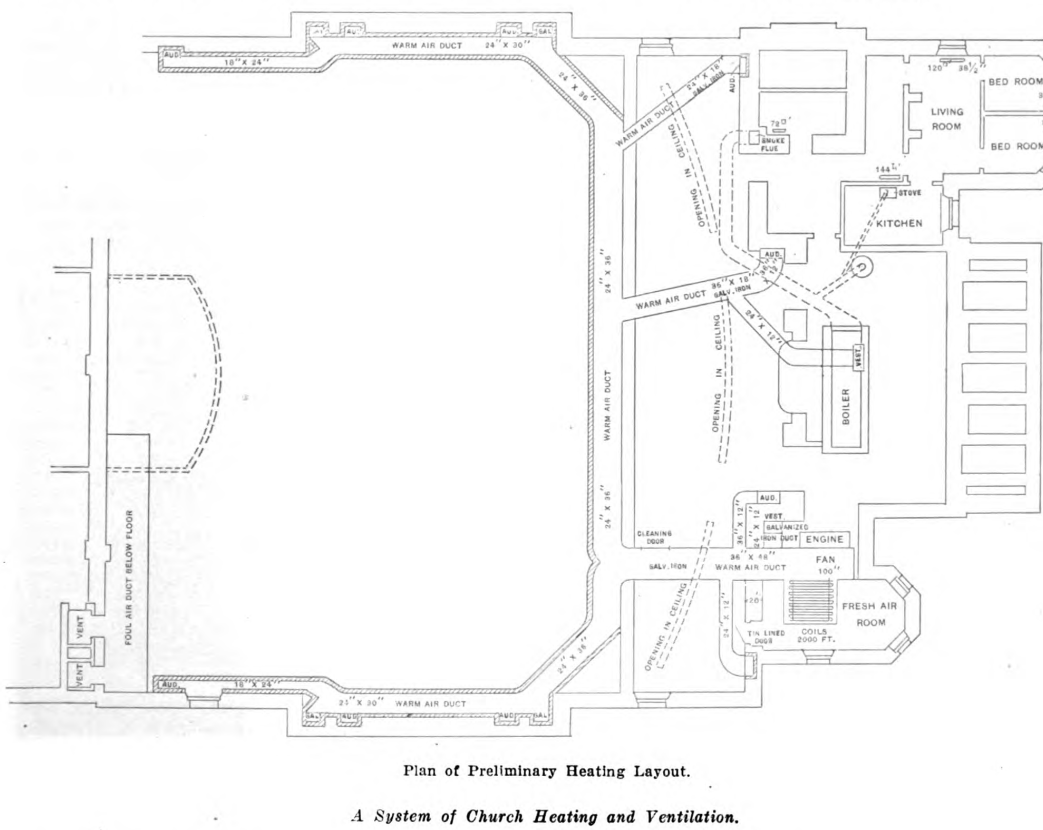
that it can be of service in helping offset the front wall losses. For the 510 sq. ft. shown as desirable for the front wall two indirect stacks aggregating 460 sq. ft. have been provided.

It was required that the ventilation should be provided in the terms of about two changes per hour, and the fan installed is a 100-in. full housed centrifugal blower, arranged to be driven at 180 rev. per min. by a 5-hp. electric motor. Such a fan delivering against 1 oz. pressure, having a blast wheel 5 ft. in diameter, should deliver 9000 cu. ft. per minute on the basis of Professor Carpenter's formula that the discharge in cubic feet per minute is equal to the product of the speed in revolutions per minute, and the third power of the diameter of the wheel in feet multipled by 0.4. As the cubic contents of the auditorium are about 250,000 cu. ft., and the fan in 30 min. will deliver 270,000 cu. ft., it is seen that the ventilator specification is lived up to. The amount of air that the indirect radiation can deliver in zero weather working without the fan may be ascertained approximately as follows: Each square foot giving off 400 B.t.u., the 2500 should give off 1,000,000 B.t.u. per hour. As the air is warmed 120 degrees, and 1 B.t.u. will warm 55 cu. ft. 1 degree, the amount of air which the radiation can warm is equal to 55/120 of 1,000,000, or 458,000 cu. ft., which, it will be seen, is very nearly in the ratio of two changes per hour. The seating capacity of the church is about 1250.

The discharge from the fan is of galvanized iron. From the fan to the adjacent wall of the fan and air chamber is a short length of the galvanized duct, and here an ingenious scheme is employed to minimize any chances of the dissemination through the building of noise from the fan. The wall is about 20 in. thick and the galvanized connection is carried into the opening about 5 in. The opening in the wall is divergent, or gradually openng in the direction of air flow, and the passage within the wall of, perhaps, 10 in. This measure is calculated to prevent the transmission of any vibration. The galvanized iron connections from the sub-



Plan of Church, Showing Gallery.



Plan of Preliminary Heating Layout.

A System of Church Heating and Ventilation.

continuation of the galvanized work leading to the brick air duct beyond starts about 5 in. inside the other face of the wall, so there is a break in the metallic air passage terranean conduit for the indirect stacks located against the front wall are indicated in the drawings. Outside of these two stacks all of the indirect stacks are located directly in the brick air conduit, six on each side. Three of these supply air to the auditorium floor and the remaining three on each side supply the gallery. The chambers containing radiators for the main floor supply are provided with switch dampers, so that the air can be by-passed in the case of these stacks and either warm, mixed or cold air can be delivered through the flues. The dampers are operated by chain and pulley from above the church floor. Two of the air supply registers on each side of the main floor are located in the window sills, with a long register, about 12 x 36 in. in size, in each case. The third register on each side for the main floor is located in the floor, while the two on opposite sides of the entrance discharge at a level 8 ft. above the floor. The registers for the supply to the gallery are located at points 8 ft. above the gallery level.

Most of the ground floor extends over the unexcavated portion of the basement, and there is an arrangement of air passages formed by 3 x 3 in. scantling, so as to carry the air from openings in the pews to a duct toward the rear of the church which discharges into a vent shaft. There are also air vent openings in the rise to the platform of the pulpit, these register openings communicating with the main vent duct and leading to a second vent shaft. Besides depending on the warm air within these vent shafts for securing the desired upward draft to the outside atmosphere, which draft is of course augmented when a slight plenum is maintained with the fan in operation, there is alongside the vent shafts a smoke flue from the heating apparatus of the adjoining Sunday school building, and the heat thereby available is utilized toward accelerating the draft. The openings into the vent shaft at the rear of the church are provided with galvanized iron dampers, which can be opened and shut from the basement in the front part of the church, wire ropes being carried from the rear to the front of the building through one of the large air ducts.

To provide for the internal circulation of the air when the church is unoccupied and when the only requirement is heating, so that it is unnecessary to have a continual flow of fresh air passing through the building, there are three boxes on the floor of the church below the rear circle of pews, as indicated in the basement plan. The opening into the boxes from the church is along one side and is protected with wire gratings, and the floor below these boxes is cut open so as to allow a flow of air from the church to the basement. The inside air can then be drawn from the church to the fan chamber and thence conducted into the subterranean air passages to be warmed and discharged into the auditorium, or it can be led directly into the subterranean air passages. There is also provision for a circulation of air between the space below the gallery and that above it, six openings each, with a register 20 x 18 in. in size being provided in the gallery floor.

The steam is generated in a Mount Royal sectional boiler, with a rated capacity to carry 5750 sq. ft. of direct radiating surface. This boiler, which was built by the Mackay Mfg. Company, New York, supplies a 5-in. main for the indirect stacks and a second main for the three direct steam radiators shown in the plan of the church. Alongside of it is a hot water boiler for heating the janitor's quarters and the minister's study, located in the front part of the church. The run of the mains is indicated, and, as stated, it will be noted that they are carried large in size, because there will be considerable condensation in them before the steam can reach the indirect stacks. The supply to the stacks is all 2 in. in diameter, with 2 in. return from the stacks having 230 sq. ft. of surface, and 1½ in. return from the rest. The indirect radiation is Manhattan pin radiation, made by the Mackay Mfg. Company. A cheesecloth filter is used for filtering the air before it reaches the fan. The flues which have been provided in the building construction are 12 x 24 in., both for main floor registers and for the gallery registers.

His many friends in the profession will be gratified to learn that John Wynkoop, a member of the architectural firm of Squires & Wynkoop, 44 Cortlandt street, New York City, has been selected professor of architecture on the faculty of the New York School of Applied Design, succeeding Harvey Corbett, recently resigned. Mr. Wynkoop holds degrees from Rochester and Columbia universities, and is the second winner of the Paris prize and a medalist of the *Ecole des Beaux Arts*.

Reinforced Concrete Water Tank.

A reinforced concrete water tank 30 ft. in inside diameter and 90 ft. high, built similar to the common type of steel standpipe which is of constant diameter from the ground up, has been built by a railroad company in Mexico. The foundation, according to the *Railroad Age Gazette*, is octagonal with a minimum diameter of 38 ft., is 5 ft. 3 in. thick, and rests on 97 Simplex piles, 3½ ft. on centers. The wall is 10 in. thick at the bottom, but for a hight of 4 ft. above the floor the thickness is 18 in., in order to make an efficient joint with the floor. The shell decreases to a minimum of 5 in. at the top. It is reinforced horizontally and vertically with corrugated bars in two circles, 2½ in. apart at the bottom and 2 in. at the top, one circle stopping 14 ft. 4 in. from the top and the other continuing in the middle of the wall. The vertical rods are ½ in. square, set staggered in the two circles and 10½ in. apart, making 55 in each circle. The horizontal bars vary from ¾ to ⅜ in. square, from the bottom to the top of the tank, the spacing depending on the depth of water. The minimum spacing of the ¾-in. bars is 2⅜ in. on centers.

The floor is a 9-in. layer of concrete over the foundation slab, and is reinforced with ¼-in. rods, 8 in. on centers in both directions. The wall and floor are made of 1:2:3½ concrete with ¾-in. broken stone, while a 1:3:6 mixture was used in the foundation. Both wall and floor are waterproofed with Medusa compound, and the inside painted with one coat of Werco liquid waterproofing cement. A manhole is built into the lower 4-ft. ring.

The tank has been kept filled to within 4 in. of the top; there was considerable sweating the first three weeks, but since then, it is reported, the tank has been perfectly dry.

The Carrara Marble Industry.

The magnitude of the trade in Carrara marble will be appreciated from the following figures of the export last year, forwarded by Mr. Pogson, the British Vice-Consul at Spezia:

Country.	1906. Tons.	1907. Tons.	1908. Tons.
United States	54,567	58,441	47,431
United Kingdom	34,624	36,946	33 474
Belgium	24,668	30,239	30,439
France	22,599	19,070	21,824
Germany	16,866	29,579	27,945
Argentina	15,979	17,540	15,870
Austria-Hungary	9,782	9,939	10,072
Egypt	7,607	9,947	7,028
Netherlands	4,401	4,953	6,263
Brazil	4,354	5,373	5,472
Spain	4,837	5,917	5,234
Switzerland	5,883	6,737	4,539
Tunis	2,366	1,108	2,159
Russia	934	1,856	2,440
British India	1,917	1,887	2,229
Turkey	2,836	2,997	2,137
Australia	1 536	2,972	1,719
Other countries	16,540	16,945	17,986

These figures are taken from the statistics issued by the Minister of Finance for the last three years.

At a recent meeting of the Board of Directors of the Northwestern Cement Products Association, E. A. Pfiffner, St. Paul, Minn., was unanimously elected secretary to succeed J. C. Van Doorn, resigned. The new secretary is well fitted for the duties of the office to which he has been elected, as he has for a long time past been identified with concrete machinery interests. Some five years ago he, with his father, bought an interest in the Cement Tile Machinery Company, and later, disposing of their holdings, they organized the St. Paul Cement Machinery Company.

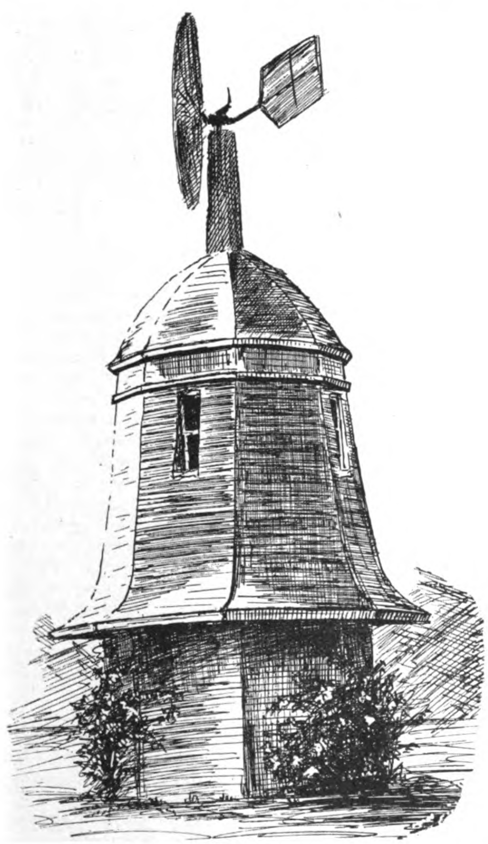
SOME QUAINT WINDMILL TOWERS.

By George E. Walsh.

THE water problem must be solved in many parts of the country by the artesian well and a windmill pump, and the designing and construction of towers for inclosing the working machinery of the plant so that they will harmonize with the landscape and surrounding buildings are questions that demand careful thought. There are many picturesque windmills in different parts of the country, some of which are too crude to attract attention and others positively homely. Architects are required to put nearly as much thought in a windwill tower as in a small barn or shed.

A windmill properly constructed is not an unsightly object; but, on the contrary, while it proclaims its practical usefulness to all, it is picturesque and attractive; as, for example, that illustrated in Fig. 1. The most unsightly object is where the steel frame of a tank or a wooden tank for storing water is left bare and exposed to all eyes. The skeleton work of the whole structure is thus left unfinished. Out of self-respect and that for neighbors every one should make it a point to cover the stand pipe and tank with a wooden structure of some kind.

The whole work of constructing a good water supply plant for the country home is frequently a problem of the



Some Quaint Windmill Towers.—Fig. 1.—A Windmill of Good Proportions.

deepest concern. A driven well will sometimes supply one with all the good water needed, and this can be driven at home by lengths of pipes joined together for this purpose. But this is only applicable in light soil and at very moderate depths. The true artesian well must be driven by machinery, and the cost of this varies from $5 to $7 per foot up to depths of 200 or 300 ft. and for greater depths from $7 to $10 per foot. The character of the soil must also influence the cost of driving the well.

In estimating the cost of a well and windmill, the depth must first be calculated at least approximately. If one can strike water at 50 ft., the cost of the artesian well should not exceed $300 for getting a good water supply. On the other hand, good well water can often be obtained at a depth of 15 or 20 ft., and then by the use of a windmill pump this can be stored in tanks for delivery to the house or barn as needed.

With a good water supply provided, the question of raising it the most economically to a storage tank must

Fig. 2.—A Low Tower of Modified Dutch Type.

be considered carefully. The windmill is the cheapest method of raising water, for there is no fuel consumed, and the cost is limited to repairs and general maintenance. Windmills have a habit of getting out of order, apparently, if one can judge by the numerous broken vanes one sees in the country, but this is often due to carelessness and the fact that the owner cannot get up to make repairs without going to a good deal of expense. A windmill, like everything else, must be painted, oiled and kept regularly in repairs. Otherwise it will quickly degenerate and go to pieces.

Next to the windmill comes the storage tank for the water pumped up. The most common method is to build wooden tanks for storage purposes, but the iron standpipe is much in favor, although more expensive. Both of these, however, are ugly in appearance and need a shell of wood to conceal them. The wooden storage tank is cheaper than iron and should be made of large size. They should preferably be constructed of pine, and holding from 500 to 20,000 gal., much depending upon the amount of water needed. These tanks must be carried up high enough to give sufficient pressure to drive the water to the highest point needed. If the tank is a large one it can be used for fire protection in emergencies. The tanks should have their upper part just below the windmill. A low squat form of tower as shown in Fig. 2 is sometimes more picturesque than a tall slender one. The only excuse for the latter is that the windmill at the higher altitude may catch more breeze. But where a storage tank of sufficient size is installed there will never be any danger of a water famine on account of lack of wind. It is much better to spend the money on a 5000-gal. tank than to put it in fancy windmill work and sacrifice thereby the size of the tank.

The proper method is to construct the storage tank first, and then adapt the shape and style of the wooden covering to suit it. A wooden storage tank perched on an elevation where the base is on a level with the upper story of the house is not difficult to build, but if it must be carried above the top floor of the living house on a special foundation, the work is more complicated. As a rule the windmill is located on high ground in order the better to catch the wind, but sometimes, owing to the depth and location of the underground springs, it is easier to erect the storage tank and windmill on a level with the house.

Instead of building a foundation for the storage tank

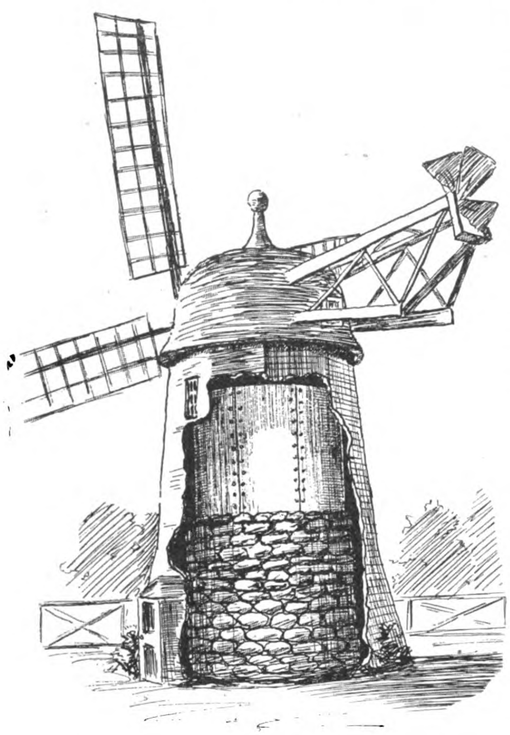


Fig. 3.—Broken View Showing Interior Storage Tank Placed on Stone Foundation.

Some Quaint Windmill Towers.

of ordinary wooden beams and joists, it is much simpler and less costly to make a foundation of stones, as in Fig. 3, laid up in cement or of brick or concrete blocks. This circular foundation incloses the well, allowing sufficient room for the pump and for cleaning purposes. The base of the foundation wall should be at least 12 to 14 in. thick, tapering gradually to 8 in. Such a circular wall will support any storage tank needed. On the top of the wall, which should be carried up as high as the water supply for the house is needed, 2 x 6 in. beams are laid, with another layer crossing at right angles. The sides of the tank must be built with similar heavy joists or beams, and so firmly constructed that the weight of the water cannot burst them apart. The copper or galvanized tank to be placed inside of this wooden tank cannot withstand the pressure of the water unless there is a firm backing on the sides and bottom. The shape of the tank is immaterial except so far as it must conform to the shape of the outside wooden shell.

After the tank is once built the question of building a wooden cover for it is one that must depend a good deal upon the amount of money one is willing to invest in the plant. For a square low water tank the modified Dutch type of windmill is most appropriate. There is nothing inartistic about such a design, and as the hight is moderate there will be fewer extra lengths of beams to supply.

The modified Dutch type of windmill tower is most suitable for open country where there are few if any obstructions to the wind. It is not specially adaptable to hilly and heavily wooded districts. Its low head would hardly reach above the trees to catch the breezes. Otherwise it is one of the most satisfactory types of buildings. It is shingled to produce the highest effects, but the circular top calls for considerable expense. This is modified in some cases by adopting a hexagonal or octagon shape, so that only straight lumber is required. There is, in fact, a wide latitude open for modifications of this type to suit special needs.

The most typical of windmills found in many parts of this country is the long slender tower, with a circular top, where the owner can work easily to make repairs to the machinery above. The great drawback to this type is that the storage tank is invariably small and inadequate to the water needs. If it is an iron standpipe it is long and slender, and of small capacity. The same is true of the wooden tank. It has too limited room for proper expansion. The greatest mistakes in windmill construction is the building of storage tanks of small capacities. There are water famines then every summer, and if a week or two of quiet weather prevails the water gives out entirely.

Where expense is no consideration, a huge iron standpipe inclosed in a large shell of wood gives satisfactory results, but the cost is considerable. The wooden shell of such a tower would cost upward of one or two thousand dollars. On the other hand a low, squat tower could be built for half of the sum. A wooden storage tank of 3000 gal. capacity raised 30 ft. should cost about $300, and to inclose this with a wooden shell an extra cost of four or five hundred dollars would be required. A 12-ft. windmill and necessary piping would bring up the cost of such a plant to $1,200 or $1,500. Of course much cheaper windmills and their wooden towers are built, but in most cases efficiency and artistic results are sacrificed. That is, the storage tank is small and the windmill incapable of lifting up more than just enough for daily use when there is a fair breeze blowing. Nothing is being stored up for days when the wind is not blowing. Likewise the tower covering is cheap and inartistic, making a blemish instead of an effective sight on the landscape.

The water supply problem is becoming acute in many parts of the country. Towns and cities are hunting for new supplies and constructing costly systems of filtration. Private, State and national engineers are tapping rivers and constructing dams to impound water for drinking and irrigating purposes. The individual owner of a country place is facing the same problem and many methods are being adopted to secure results. The hydraulic ram and the gasoline engine have come into great popularity for pumping up water to storage tanks either in the house or outside; but these require certain physical conditions and water supplies that cannot be found everywhere. They are very serviceable where there is a pond or lake in the vicinity.

The old windmill is not to be displaced by these new pumping inventions, and in many parts of the country it is simply a question of a hand pump, bucket well, or a windmill pump. Naturally the latter is the one that appeals to the greatest number. The windmill made Holland as much as its dykes did, and to-day the Hollanders depend chiefly upon windmills for their water supply and also for pumping water back into the seas. An effective windmill is a possession of great value and it cannot be lightly considered or overlooked.

The carpenter is therefore an important factor in deciding the ultimate success of this method of water pumping. The windmill companies can supply the windmill and the pumping arrangement, but it remains with the former to construct the tank and tower shell. It is much better to get the estimates on a windmill of a certain lifting capacity and then secure the services of a practical builder to put up the tank and make plans for inclosing the whole plant with a tower of artistic proportions. The lifting capacity of a windmill has nothing to do with its ability to supply water continuously unless an adequate storage tank is provided. The windmill may do all that is claimed for it in windy weather, but there are weeks and almost months in sections of the country when the wind blows so softly that a windmill could not work at half its full capacity. Without a big storage tank then the supply of water would soon give out.

In building storage tanks for rain water, builders usually compute the size of the tank required by the average rainfall. The average rainfall in our northern States is 48 in. a year, and throughout the country only 36 in. A roof of 1000 sq. ft. would, according to the former rainfall, receive an average of 70 gal. of rain water a day. But there are weeks at a time when no rain falls, and if the tank is not large enough to keep a supply ahead the water famine would follow. Each gallon of water requires 231 cu. in. of space. The average family uses about 8 gal. of water per day for each member, taking the consumption month by month, which includes water for the weekly wash.

From these figures it may easily be concluded that a big storage tank is essential for the ordinary family, one that will hold at least 2000 or 3000 gal. Anything less than this means dissatisfaction to the owners. Many windmills have been allowed to go to pieces simply because there was always trouble with the water supply. This was due to the lack of sufficient storage supply, and not to any pumping defect of the windmill.

Prize Contest for Best Examples of Concrete Block Construction.

The extent to which concrete blocks are at present being used in connection with the construction of buildings of all kinds and particularly those intended for dwelling purposes can scarcely be appreciated, except by those who are practically engaged in the building business. With a view, however, to showing the general public some of the many interesting examples of high class concrete block construction and at the same time demonstrating to those unfamiliar with the artistic, practical and commercial possibilities of this building material, the Century Cement Machine Company, 299 St. Paul street, Rochester, N. Y., has inaugurated a plan for accomplishing this purpose by offering a series of cash prizes for photographs showing examples of concrete block construction, the contest being open to all users of "Hercules" machines, and covering all types of buildings, such as residences, churches, factories, &c. The prizes will be awarded at the convention of the National Association of Cement Users to be held in Chicago, February 19 to 26 of the coming year.

The winners will be determined by a committee composed of one representative from a number of trade publications, most of which are devoted to cement and concrete work, a leading architect, a well-known and competent builder familiar with this type of construction, and a representative of some one of the leading Portland cement manufacturing companies.

Getting Out a Circle Top Sash.

Methods used by the millman in getting out various kinds of work have been described in recent issues of *The Wood-Worker*, and among the later contributions is one from a correspondent in which he tells how to get out an ordinary cut-up circle top sash. He points out that in some mills little attention is given to this very particular piece of work, while in others it receives no consideration whatever, as it is made only in the quickest way possible. Adverting to the illustrations special attention is directed to the construction indicated at A of Fig. 1. The mortise, tenon and miter together, says the correspondent, form a good, lasting piece of work. Particular attention is also called to the construction at C. Many operators make the construction here with three joints, which makes it impossible to last for any length of time. Now, a way which I have followed successfully for some time, and which has given good satisfaction, is shown at C. I first cut my muntins, as shown in Fig. 2, then shape it as desired, and afterwards cut along the dotted lines as shown. This is easily membered to piece 2. Having fitted piece 1, I then fit pieces 4 and 3 at one end, then piece 2 is fitted to piece 1 and fastened in sash. Pieces 3 and 4 are then fitted and fastened. I then proceed with the other parts as in 1, 2, 3, 4. This makes a good and lasting job, and is easily put in place.

If any one can tell of a better plan, I would be much pleased to hear from them. Discussing a subject brings out its best points.

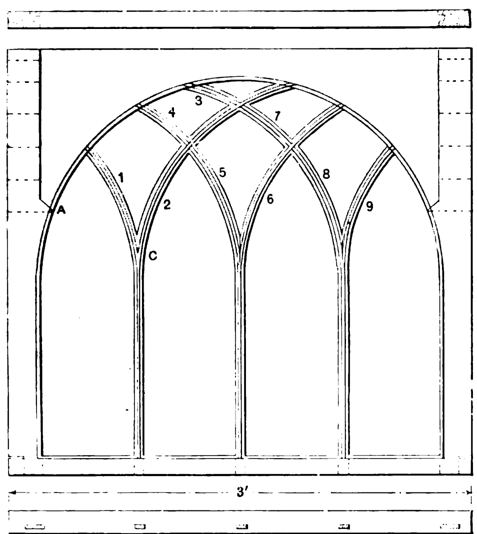


Fig. 1.—Plan and Elevation of Upper or Top Sash.

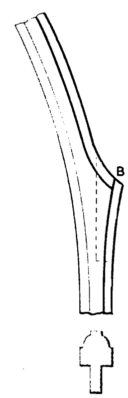


Fig. 2.—Details of Sash Bar.

Getting Out a Circle Top Sash.

Painting a Dwelling with Tuscan Red with White Trim.

In a case where it was desired to paint a house with pure Tuscan red for the body and the trim with white lead the question was asked if the painter should thin the Tuscan red with linseed oil the same as he would white lead, and what should be the proportions.

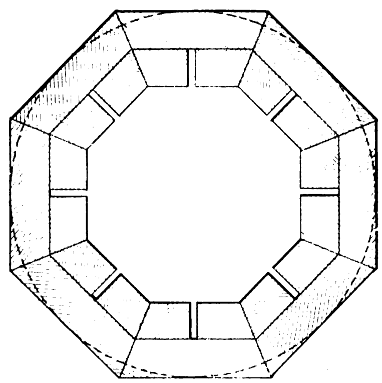
In reply to the query of its correspondent a recent issue of *The Painters' Magazine* said: If the job is one of repainting, we would suggest that you thin the Tuscan red, which, we suppose, you buy ground in oil, as follows: To 10 lb. Tuscan red in oil, after beating the same to an even consistence, add ½ pint of best brown japan, 1 pint of turpentine and 1 gal. pure raw linseed oil for the first coat, applying the paint evenly and well brushed out.

For the finish, mix in same way, but use only one-half as much turps, but be sure that the first coat has thoroughly dried.

If the job is a new one and the wood has not yet been primed, would suggest that you use pure white lead tinted with lampblack to medium lead color as a first or priming coat, thinning the tinted lead with 5 qt. of raw linseed oil and 1 gill of liquid drier for every 25 lb. of the lead. Over this priming apply your Tuscan red in the same manner as for old work. Not knowing the brand or quality of Tuscan red you propose to use, we cannot give you more explicit directions for thinning. Pure fire-boiled linseed oil might be better for thinning the red for the finish than raw oil, on account of holding its gloss longer, but unless you are sure of the oil being fire or kettle boiled you had best stick to the raw oil.

Remedying Trouble with Interior Hardwood Columns.

In referring to a method for preventing unequal shrinkage and swelling of the two different woods used



Remedying Trouble with Interior Hardwood Columns.—Cross Section Showing Saw Kerfs Somewhat Enlarged.

in making hardwood staved columns for interior use, a writer in a recent issue of *The Wood-Worker* presents the following suggestions: If the material remained in the same degree of dryness as when put together there would be no opening up of the joints and even after they are once filled and finished there is not as much danger, owing to the fact that they are not then so subject to the changes of the atmosphere as before.

Without hesitation or untruthfulness, I can safely say that the majority of houses are finished before the plastering is thoroughly dry. While it may have the appearance on the exterior of being dry, you will find about nine times out of ten the studding is still soaked with water, and if the house were closed up tightly the windows would soon be covered with moisture. The mill man is often censured for turning out poor work, when it is the fault of the owner or contractor—more often, probably, the owner, as when the building reaches this stage the owner begins to get impatient and anxious to see it completed—for allowing this class of work to be put into a building. I have not only known columns to have been ruined by being placed in damp houses, but also veneered doors, panel work and other interior trim.

To obviate this difficulty of unequal shrinkage and swelling of the different woods employed in making columns, we adopted, several years ago, the system of running a saw kerf through the pine backing, which naturally swells and shrinks more than the hardwood. This has practically solved our column troubles, as since that time we have never had any columns to open at the joint. I inclose herewith sketch which will readily convey the idea to any one interested. This kerf, being directly back of the thick part of the hardwood stave, after the column is turned, does not impair the strength of the column.

French Houses Are Artistic.

The influence of the French on the architecture of the present day is exerted through their school of architecture, L'Ecole des Beaux Arts, the leading school for architecture in the world. Owing to the true artistic democracy and liberality of the French, this government school has been open to students of all countries, and its influence is world-wide. We in America must also pay tribute to this great school, as its influence was a timely aid to us in shaping, through the American students, our architectural destiny when we were sorely in need of it, says William Neil Smith in the *Delineator* for October. We owe it mostly to the French that we are at the present, for the first time, ranking favorably with, if not surpassing, our older mother countries in Europe.

A house that is typical of the French movement is stucco washed a pure white. The roof of the tower is covered with light green glazed tile. The small brackets directly beneath the roof are painted a vermilion red. The large brackets are painted white, to harmonize with the rest of the building. The sash of the windows are painted white, but the frames are green. The ornamental balconies which project from the face of the tower and the building proper are constructed of saw balusters and wood strips in pattern, and are painted green, the same shade as the roof and the frames of the windows.

The harmonious awnings were evidently designed, as they should be, by the architect, to form an integral part of the building; and too much stress cannot be laid on the importance of carrying out this idea. In this instance they are white and green striped, the green exactly matching the green of the woodwork on the rest of the exterior.

The roof garden and sun parlor form a very interesting and practical feature, and one which is seldom incorporated in a small house in America. It not only adds a great deal to the living qualities of the house, but, as is shown in the illustration, has been made an addition to the beauty of the building as well. The tower forms the sun parlor, inclosed in glass for the winter, not in temporary sash, but with permanent glass inclosures, with sash which can be thrown open during the summer and which are part of the design.

Strikes and Lockouts in Bavaria and Saxony.

Some very interesting statistics in regard to strikes and lockouts in Bavaria and Saxony in 1908 are contained in a report by Consul George N. Ifft of Nuremberg, wherein he says:

In the Kingdom of Saxony, with a population of 4,600,000, and the busiest hive of industry in Germany, there were 152 strikes in 1908, against 239 in 1907. These strikes involved 602 concerns and 18,862 workmen, against 35,087 workmen in 1907. In 23 cases the strikers won victories, in 50 cases partial successes, and in 76 cases lost. The largest group was in the building trades, with a total of 58 strikes. There were in Saxony, during the year, 13 lockouts, involving 84 concerns and 3469 employees. The industrial depression which prevailed in 1908 had the effect of lessening labor disputes in both Saxony and Bavaria.

In the Kingdom of Bavaria, with a population of 6,500,000 and containing the great manufacturing cities of Nuremberg and Fuerth, as well as large porcelain, glass, and brewing industries, there were 164 strikes and 28 lockouts in 1908, against 266 strikes and 20 lockouts in 1907. These 164 strikes resulted in victories for the strikers in 30 cases, partial victories in 56 cases and defeat in 78 cases. In the lockouts the employers were successful in 18 cases, partially so in 5 cases and lost out in 5 cases. The strikes and lockouts involved 8228 and

2855 workmen, respectively, against 22,582 and 2854 in 1907.

The largest group of strikers was in the building trades—2204 men and 58 strikes. The next largest was in the clothing industry, with 11 strikes. The causes of the strikes were: Questions of wages, 69; hours of labor, 8; both wages and hours, 38; various other causes, 49.

The loss in wages due to the strikes and lockouts was only $94,343, against $293,246 in 1907. Industrial disturbance caused by trade disputes in the United Kingdom was greater in 1908 than in any year since 1898. This result was entirely accounted for by the disputes in the engineering and shipbuilding industries of the northeast coast and in the cotton spinning industry of Lancashire. These three disputes laid idle 166,000 work people, and caused a loss in working time of 8,250,000 working days.

New Publications.

Masonry Construction. By Ira Osborn Baker, Professor of Civil Engineering, University of Illinois. Size, 6½ x 9¼ in.; 746 pages and 244 illustrations. Bound in cloth. Published by John Wiley & Sons. Price, $5.

This is the tenth edition, entirely re-written and enlarged, of a work which will be found of special interest and value to architects, builders, contractors, and, in fact, all having to do with masonry construction. The first edition of the volume, which appeared in 1889, was the outgrowth of the needs of the author's own classroom. Developments, however, in the manufacture and testing of Portland cement and the increasing use of concrete made a revision necessary in 1899, and now the extensive use of plain concrete, together with the introduction of reinforced concrete, render a further revision essential. The entire work, therefore, has been re-written, to the end that it may be brought thoroughly up to date in various matters and numerous modifications made in the text.

The volume has been increased by adding to the size and the number of the pages. Numerous changes and additions have also been made throughout the book, but the greater portion of the entirely new matter is found in the chapter on "Plain Concrete," and in three new chapters on "Reinforced Concrete," "Concrete Building Blocks" and "Elastic Arch;" also in connection with new structures illustrated. The number of the latter has been materially increased and the author is of the opinion that those to which reference is made represent the best practice of leading engineers. The work is comprised in 4 parts and 23 chapters, exclusive of an appendix giving three specifications—for cement, for concrete and for masonry.

In considering the subject of plain concrete the author first treats of the materials, then takes up the laws of proportions, illustrates and describes some of the "forms" used in connection with concrete construction, discusses the making and placing of concrete and considers its strength, weight and cost. In the chapter on "Reinforced Concrete" attention is given to beams and columns, with a number of details of construction.

There are interesting chapters on brick masonry, ordinary and pile foundations and concrete building blocks, the latter chapter carrying illustrations of hollow blocks of various manufacture and walls constructed of two-piece and three-piece blocks.

Not the least interesting feature of the work is a comprehensive index alphabetically arranged.

Structural Details or Elements of Design in Heavy Framing. By H. S. Jacoby, Professor of Bridge Engineering, Cornell University. Size, 6¼ x 9¼ in.; 368 pages. Illustrated with 339 figures and 6 folding plates. Bound in cloth. Published by John Wiley & Sons. Price, $2.25, postpaid.

While this work is intended more particularly perhaps as a text book for the students taking a course of instruction indicated by the title in the College of Civil Engineering in Cornell University, it is of a nature to strongly appeal to the ambitious and enterprising builder who desires to familiarize himself with the elements of design in heavy framing. Experience, the author points out, has shown that in many respects problems involving timber construction are better adapted for the purpose of demonstrating the application of the principles of mechanics to the design of the details of buildings than if confined to structural steel. A great deal of attention has been given to details in connection with examples on the design of joints, beams and trusses, as it is felt that the importance of careful study of every detail can only thus be properly emphasized. In several instances the order of design is given in full with the idea of economizing the time of the student and of promoting systematic habits in making the computations required, these objects being regarded as important elements in efficient engineering education and practice.

The work is divided into six parts or chapters, the first of which deals with the various kinds of designing used in framing; in the second chapter the author discusses the joints used in framing, of which it is well known there are quite a variety; wooden beams and columns constitute the theme of the third chapter, following which he considers wooden roof trusses. Here it is shown how to figure stresses in rafters and purlins, truss loads and stresses, design joints of various kinds, and estimate the approximate cost of a roof truss. In the fifth chapter are a number of examples of framing in practice, embracing slow-burning construction, trestle construction, arch centering, small bridge trusses, &c. The last chapter in the book deals with timber tests and unit stresses in connection with which reference is made to building codes of various cities and a list is given of reference handbooks.

Hints for Carpenters. Compiled and edited by Albert Fair. Size, 5 x 7½ in.; 144 pages; 100 illustrations. Bound in cloth. Published by the Industrial Book Company. Price, postpaid, 50 cents.

This little work consists of a collection of useful hints, ideas, wrinkles and suggestions, giving directions for making various tools and appliances that are calculated to lessen the work of the carpenter and joiner. The matter is arranged under various headings, which afford an idea of the scope of the work. Among the more important mention may be made of the care of tools, filing saws, sharpening plane irons, hints on home-made tools, constructing toolboxes and chests, some comments on nails and screws, scaffold brackets, fitting doors and blinds, repairing and finishing floors, &c.

Wood Turning.—By George A. Ross, Instructor in Woodwork and Pattern-Making at the Lewis Institute; 76 pages. Size, 6½ x 7¾. Numerous illustrations. Bound in cloth. Published by Ginn & Co. List price $1; mailing price, $1.05.

The object of this work has been to place before the students in manual training, high schools, technical schools and colleges, such information as will be of practical help to them in their work in wood turning. The course and problems covered are those which pupils in elementary woodwork at the Lewis Institute are required to complete during the first course in shop work and are so arranged that each successive lesson contains a new principle closely related to those in previous exercises. The author states that the book is intended for class work, but should be supplemented by instructions and demonstrations given by an instructor in charge.

In the introductory portion of the work the author discusses the subject of lathes and their development, tools used in turning and the grinding and sharpening of them. In the next section he takes up lathe-tool practice and then presents a series of supplementary exercises in connection with which many useful ornamental pieces of work which can be turned out on the speed-lathe are illustrated and described. An appendix relates to finishes, fillers, stains, recipes, etc. The entire matter is arranged in a style which cannot fail to prove of value to those who are interested in the subject of wood turning.

Practical House Framing. By Albert Fair. Size, 5 x 7½ in.; 108 pages. Profusely illustrated. Bound in cloth. Published by Industrial Book Company. Price 50 cents postpaid.

The matter contained within the covers of this little work is intended as a reliable guide for the journeyman and a practical text book for the beginner who is interested in the subject indicated by the title. The matter originally appeared as a series of articles on house framing, and was received with such favor that after being thoroughly revised and considerably new material added was issued in book form. The various chapters describe balloon and braced frame construction, particular care having been taken, the author points out, with the illustrations so as to show all details as clearly as possible.

Light and Heavy Timber Framing Made Easy. By Fred T. Hodgson. Size, 5¾ x 8¼ in.; 396 pages; 420 illustrations. Bound in board covers. Published by Frederick J. Drake & Co. Price, $2 postpaid.

This is a treatise on practical methods of executing various kinds of timber framing ranging from the simple scantling shed or lean-to, up to heavy and complicated timber construction involving centers, needling and shoring, roofing, tank frames and taper structures. The work is divided into two parts, in the first of which the author deals with joints in woodwork framing, classification of fastenings in carpentry, after which he treats of various phases of balloon framing. In the second part he takes up heavy timber framing, this constituting the bulk of the volume. Here he considers some of the many uses for which this form of construction is especially adapted and presents details in a way to appeal to the practical builder. The examples embrace the construction of spires, towers, turrets, barns, porches, centers, &c.

Trade School of Mass. Charitable Mechanic Association.

The evening trade school of the Massachusetts Charitable Mechanic Association, Boston, opened for the winter term in the Mechanics' Building, 111 Huntington avenue, on Monday, October 11, with a large attendance.

The classes which have been run so successfully in other years in carpentry, plumbing, sheet metal work, pattern draughting, bricklaying, tile setting, electricity and drawing, will be in operation three evenings each week throughout the winter.

The important feature of the instruction is the practical work in the shop, which is provided for each class. The public spirit of the Mechanics' Association in thus furnishing trade instruction becomes each year more appreciated by large numbers of young mechanics and their employers. A circular descriptive of the work of the school may be obtained by writing to the above address.

Master Builders of London.

The Master Builders' Association of the city of London, England, has been considering the scheme of erecting a building of its own so as to afford more commodious quarters for the use of the members. At the thirty-sixth annual meeting officers were elected for the ensuing year as follows:

President, William Lawrance.
Senior Vice-President, F. G. Rice.
Junior Vice-President, L. Horner.
Treasurer, G. Bird Godson.

A hearty vote of thanks was given to the outgoing president, F. L. Dove.

Settlement of Carpenters' Strike in Germany.

The settlement of the strike of carpenters and joiners which was in force in Nuremburg for something like three months provides that present wages and hours of labor shall remain unchanged until the first of April of next year. Subsequent increases, however, in wages will occur as follows:

April 1, 1910, $5.93 per week of 53 hours; April 1, 1911, $6.05 per week of 53 hours. To carpenters engaged upon building construction an additional wage, for the wear and tear of clothing, is allowed, making the weekly pay of these $6.16 until April 1, 1910, $6.56 from that date until April 1, 1911, and $6.69 from that date until April 1, 1912, when the agreement ends.

The agreement provides for a noon pause of 1½ hours, the cessation of the May Day celebration, and the right to discharge or quit work without advance notice. The latter introduces a new principle into the German labor world, it being herefore practically a universal rule in every trade, business, profession and employment to give due notice before an employee may quit or be discharged from his or her job.

Convention of Society for Promotion of Industrial Education.

The annual convention of the National Society for the Promotion of Industrial Education will be held in Milwaukee, Wis., December 1, 2 and 3. Every effort is being made to secure some of the most distinguished leaders in the industrial, legislative and educational world for addresses and papers to be delivered and read at the convention.

CONTENTS.

Carpentry and Building

NEW YORK, DECEMBER, 1909.

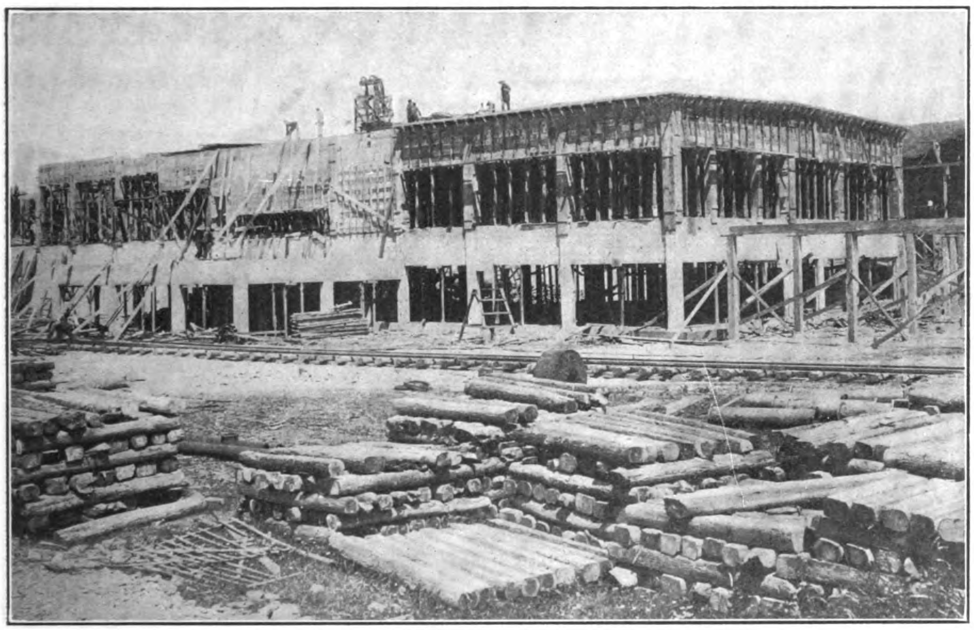
A Reinforced Concrete Saw Mill at Sheffield, Pa.

ONE of the most striking examples of the present day tendency to make use of concrete where heretofore wood has been exclusively employed is found in the reinforced concrete saw mill recently completed at Sheffield, Pa., and illustrated in many of its details upon this and the pages which follow. In this instance use of concrete was largely due to a desire on the part of the owners to escape the fire risk to which a wooden saw mill would naturally be subjected, located as it must be in the heart of a thickly timbered section and involving in its sawing operations a vast amount of material, which once ignited would produce a conflagration of no mean proportions.

The present saw mill is situated in a district where the available supply of timber is such as will likely require the operation of the plant for something like 14 years, and when the timber is exhausted the buildings can be utilized as a tannery. The plant is made up of a main building, 211 ft. long by 62 ft, 9 in. wide; a power house, 72 x 42 ft. in plan, and a lath mill, 28 x 46 ft. in area.

General views of the exterior of the mill while in progress of erection and before the wooden forms were removed are presented herewith, together with framing plans of the first floor and roof. Sectional views presented upon another page show that the sawing is done upon the machinery or second floor, so as to give maximum storage facilities below, the boards being dropped through to the ground level after sawing. A portion of the main building is three stories in hight, the third floor being used as a filing room. In order to give proper light a monitor top extends practically the entire length of the main structure. The lath mill, it will be seen, is a two-story structure, and the power house is a single story building. The capacity of the mill, which was designed by and erected for the Central Pennsylvania Lumber Company, is 165,000 ft. of lumber per day. The reinforcing material for the concrete work was supplied by the General Fireproofing Company, Youngstown, Ohio, and the work of erection was done in about four months, the contractors being the Nicola Building Company, Pittsburgh, Pa.

Notable features of the building are the exclusive use of reinforced concrete in all parts and the use of long span construction, thus enabling full length logs to pass across the mill for distribution to the various saws. A particularly striking feature of this plant and one which is not at all common in connection with the lumber industry is the reinforced concrete log bench, a view of which is afforded by means of one of the half-tone pictures presented herewith. This bench was designed to permit of rough handling of the timber, as it may be delivered to the carriage.



Exterior View of Building During Progress of Construction.

A Reinforced Concrete Sawmill at Sheffield, Pa.—Built for and Designed by the Central Pennsylvania Lumber Company.—Reinforcing Material Furnished by the General Fireproofing Company.

The columns extending through two stories of the building are 16 x 16 in., while those running to the third floor are 20 x 20 and 22 x 22 in. The intermediate columns are 12 x 12 in. The main girder spans are 32 ft. long, except those on the ends of the building, which are 40 and 45 ft. long. The larger spans of beams are 30 in. deep, this being made up of a 2½-ft. girder and 4-in. floor slabs. The bottom spans on one side are 27 ft. 8 in. long, and on the other 34 ft. 5 in. The columns are spaced 16 ft. apart. The spans of the lath mill are 14 ft. and 14 ft. 4 in., with a depth of beam of 22 in. made up of 18 in. of girder and 4 in. of concrete slab for floor surface. The ground floor of the main building is 10 ft. 6

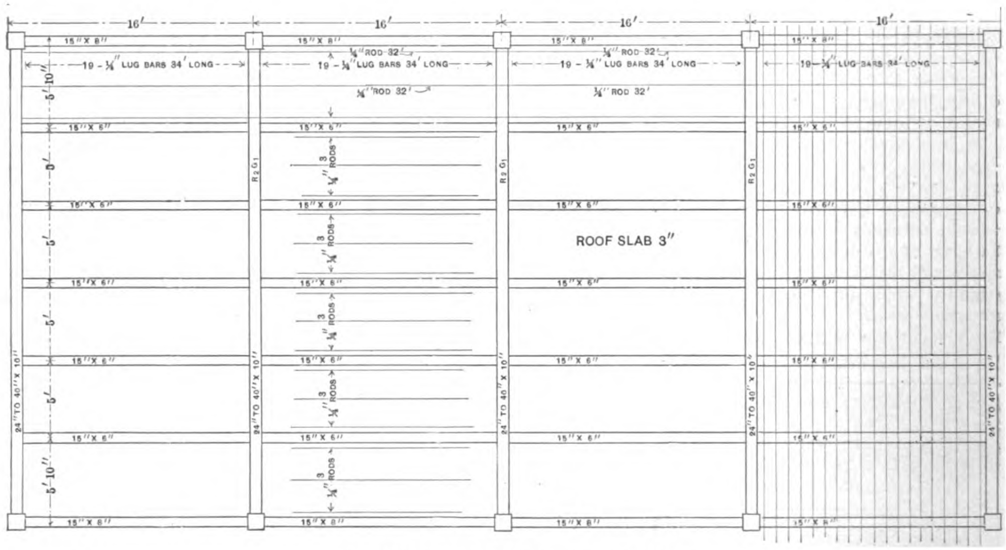
in. in the clear, and the machinery floor 10 ft. 10 in. in the clear. In the lath mill the hight of ceiling on the ground floor is 9 ft. 2 in., and on the second floor it is 11 ft. 6 in. In the filing room the hight of ceiling is 8 ft.

The depth of the girders on some of the interior spans is 5 ft. with bracketing at both ends, while in other cases it ranges from 2 ft. 6 in. to 3 ft. 6 in.

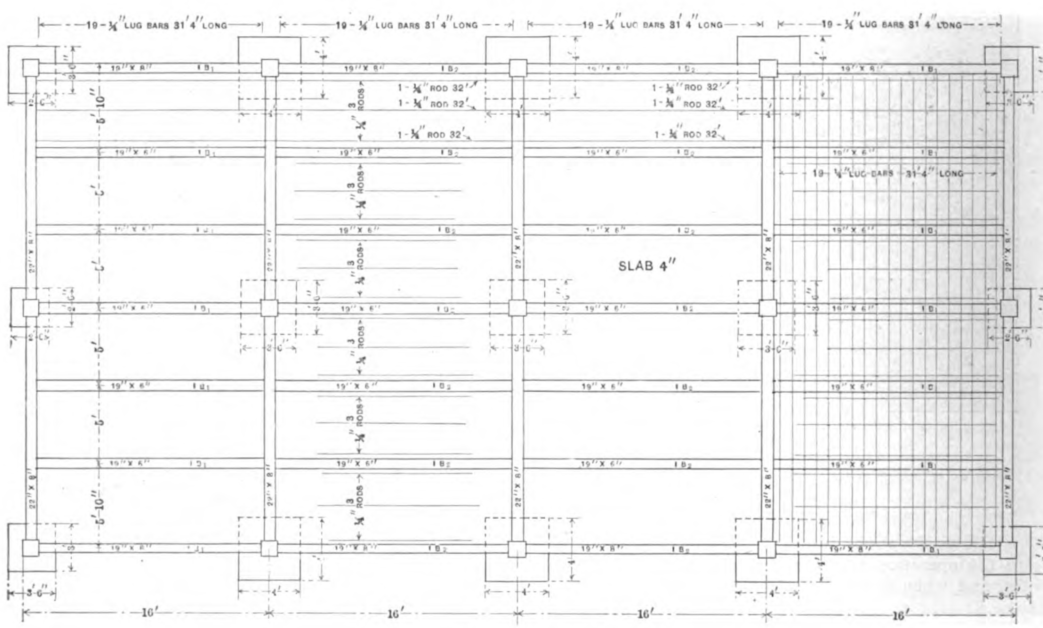
In the power house the columns are spaced 13 ft. 8 in., 14 ft. and 14 ft. 4 in. between centers, and with a hight of ceiling in the clear of 17 ft. 6 in. The depth of girder supporting the roof in this case is 4 ft.

The reinforcing material is ¼-in. cold twisted lug bars of varying lengths placed 6 in. apart, and in the roof the ¼-in. lug bars are spaced 12 in. apart. The general arrangement is such that the walls acting as deep lintel beams are reinforced with fabricated frames in which the shear members are rigidly attached, forming a wall reinforcement in addition to their resistive functions in the beams. The columns are reinforced with ¾-in. rods, ranging from four to eight in number to a column and in length from 10 ft. 8 in. to 20 ft. 6 in.

In order to obtain sufficient compression on girders and beams a T-section was used, enabling a very thin slab to be employed without difficulty. The stresses assumed were 16,000 lb. per square inch in the steel and 500 lb. per square inch in the concrete on cross bending. In the design the general uniform loading required was light, being estimated at not over 50 lb. per square foot.



Framing Plan, Showing Reinforcement for the Roof.



Framing Plan for the First Floor.

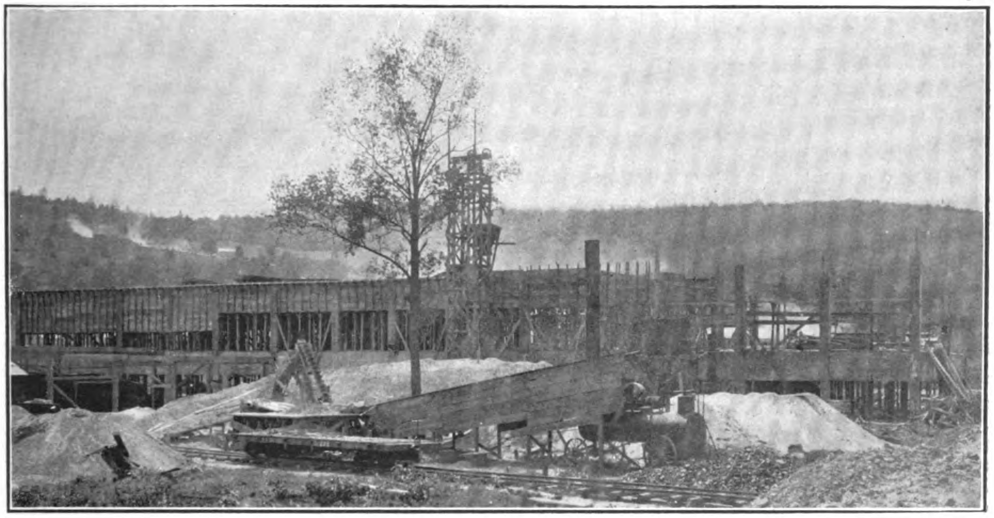
A Reinforced Concrete Sawmill at Sheffield, Pa.

An important addition to the list of reinforced concrete buildings in New York City will be the structure which has just been designed by Frederick A. Waldron, 37 Wall street, for the Engineering News Publishing Company. The building will be of brick and reinforced concrete, strictly fireproof and modern in every respect. The contract for the work has been placed with Frank

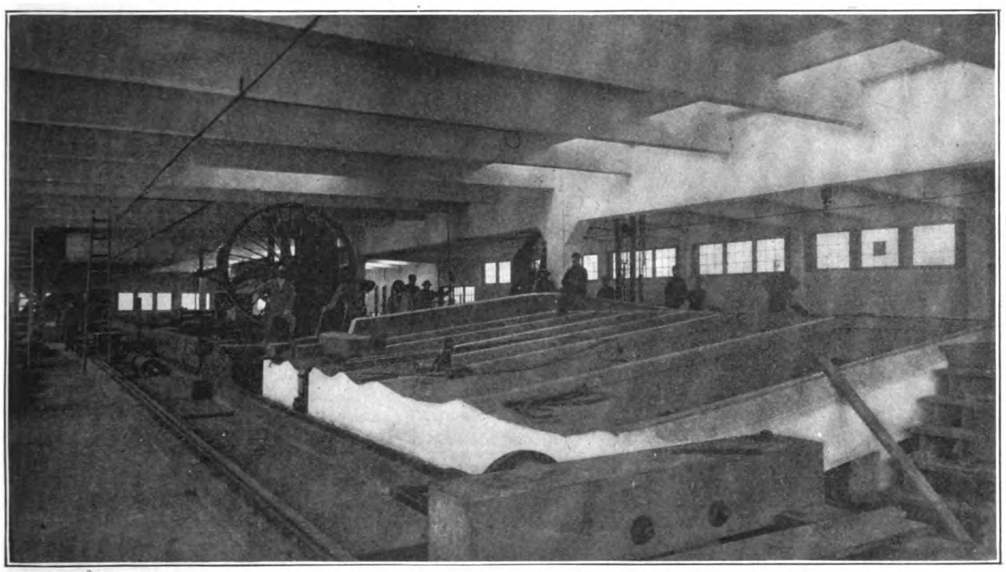
B. Gilbreth, 60 Broadway, New York City, and Mr. Waldron will be in charge of the mechanical layout of the plant.

Present Practice in Pitch and Felt Roofing.

Some rather interesting facts in regard to the durability of pitch and felt was developed in connection with the tearing down of some of the old buildings which occupied the site on Seventh avenue, Borough of Manhattan, New York, of the new terminal of the Pennsylvania Railroad Company. In razing these old buildings it was necessary to remove pitch and felt which had been in use for 30 years or more and the company's chemist analyzed it side by side with new pitch and felt and discovered that time had not changed its chemical and waterproofing qualities in any appreciable degree. In discussing the subject of pitch and felt a well known gravel and slate roofer stated in an interview with a representative of the *Record and Guide* that the terms "asphalt" and "pitch" in roofing specifications are often confused. As a matter of fact the general term is "pitch" and it includes all substances of that nature from whatever source derived, the dictionary definition of asphalt being "mineral pitch." While, therefore, all asphalt may be called pitch, all pitch cannot be termed asphalt. Of the kinds of asphalt pitch or, more briefly speaking, asphalt that can be used for waterproofing, the roofer says there are barely four or five out of 50 or more varieties that are in any respect suitable for such purposes. Of the other kinds of pitch there is only one—coal tar pitch—that can be considered for such work.



Another Exterior View of the Building, Showing Materials and Apparatus Used in the Construction Work.



An Interior View on the Machinery Floor, Showing the Concrete Log Bench in the Foreground.

A Reinforced Concrete Sawmill at Sheffield, Pa.

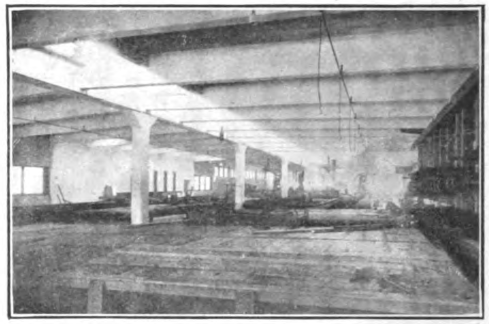
According to the roofer in question the general practice of laying such a roof over boards is as follows: "Use one ply of rosin sized sheathing paper weighing not less than 5 lb. per 100 sq. ft. Over this place five plies of coal tar felt weighing not less than 14 lb. per 100 sq. ft. single thickness. The first two plies are generally laid dry. Over this is placed a heavy mopping of coal tar pitch, then three plies of the 14-lb. felt are laid with a complete mopping of pitch between each ply of felt, so that under no condition shall "felt touch felt" above the second ply.

"Over the entire surface is spread a uniform coating of pitch mopped on, into which, while hot, the slag or gravel is embedded. For this roof 120 lb. of pitch (gross weight) per 100 sq. ft. should be used for the completed roof. If gravel is used as a top dressing, it should weigh 400 lb. to the 100 sq. ft. If slag is used, 300 lb. should be required for each 100 sq. ft.

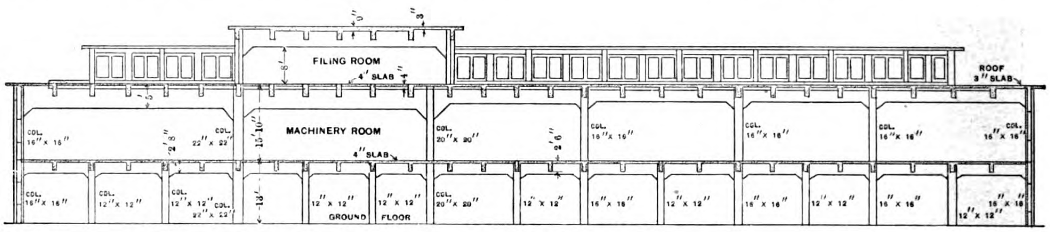
This form of roof has been commonly used for 50 years or more, and to-day is the standard roof of about 90 per cent. of the flat surfaces (by this I mean a roof having an incline not exceeding 3 in. to the foot) and many cases can be cited where coal tar pitch and coal tar felt roofs have been on from 20 to 35 years and are in good serviceable condition at the present time. While practically all of the large factories, railroad buildings and pier sheds are covered with a five-ply coal tar pitch and felt roof, this form is equally adaptable for apartment houses and city dwellings having flat roofs.

The United States navy has recently published a standard specification calling for five plies of coal tar pitch and felt finished with a surface of slag for new buildings. This specification was adopted after exhaustive investigation of the subject.

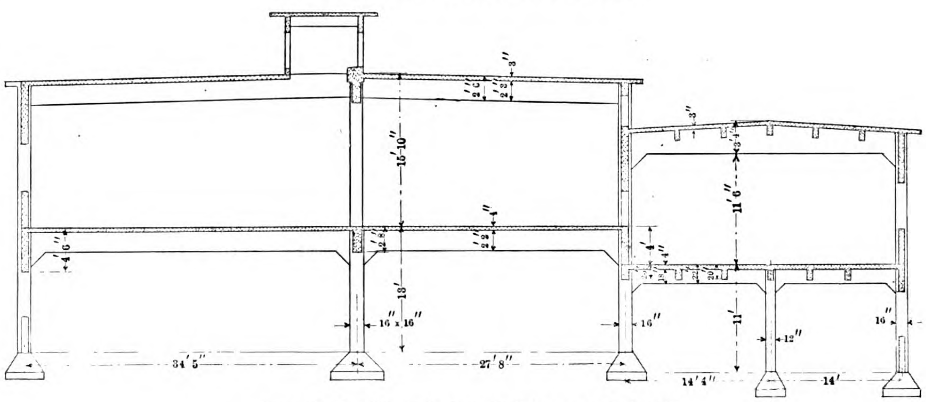
In addition to the low cost and the enduring qualities, a coal tar pitch and felt roof has a fire-retarding effect of no mean value. When exposed to a rain of burning embers from a fire near by, the non-conducting particles of stone hold the hot coals away from the wood beneath, and minimize the effect on the tarred felt. Such a roof has repeatedly proved itself as non-combustible as one of tin or other metal, and, if laid over boards, is a better protection to them, because it is a non-conductor.



Interior View of the Sawmill with Reinforced Concrete Log Bench in the Distance.



Longitudinal Section Through Main Building.



Cross Section Through Main Building and Lath Mill.

A Reinforced Concrete Sawmill at Sheffield, Pa.

Coloring Concrete Blocks.

One of the serious objections to concrete blocks in the past has been their dark gray appearance. This can be overcome by using light colored sand, or crushed stone, and a white Portland cement, which will give a light gray effect, says *Cement Age*. If a pure white effect is desired, then white cement should be used, with white sand, or crushed stone, mixed with a little marble dust. It is very difficult to obtain a coarse white sand, although there are kinds which are quite coarse. A fine white sand used alone with cement will not make a thoroughly waterproof facing. In order to make such facing waterproof, it is necessary to use a proportion of marble dust, or crushed stone, with sand. Care must be taken not to use too much marble dust, for if too much of this is used the facing will check and show unsightly cracks. For this reason marble dust should never be used alone with cement. Usually the checks and hair cracks referred to will not show until the blocks have aged several weeks, and even months, but eventually they are bound to come.

The amount of marble dust to be used should not be more than 1½ parts of marble dust to 4 parts of white sand. If the facing is too rich in cement, checks and hair cracks are liable to appear as when marble is alone used with cement. Very good results can be obtained by using limestone screenings, from coarse to fine, which will pass a ¼-in. screen, but usually it is advantageous to use a little white sand with this as well, in order to produce a smooth, dense surface.

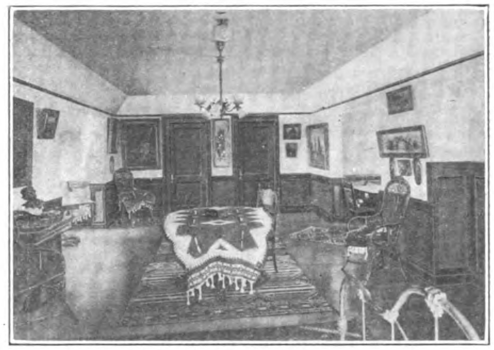
A commercial building 16 stories in hight and covering an area 69 x 90 ft. is about being erected at the corner of Fourth avenue and Twentieth street, New York, in accordance with plans prepared by Architects Neville & Bagge of 217 West 125th street. It is stated that $400,000 will approximate the cost of the undertaking.

A HOUSE OF GRANITE FACE BRICK-TILE VENEER.

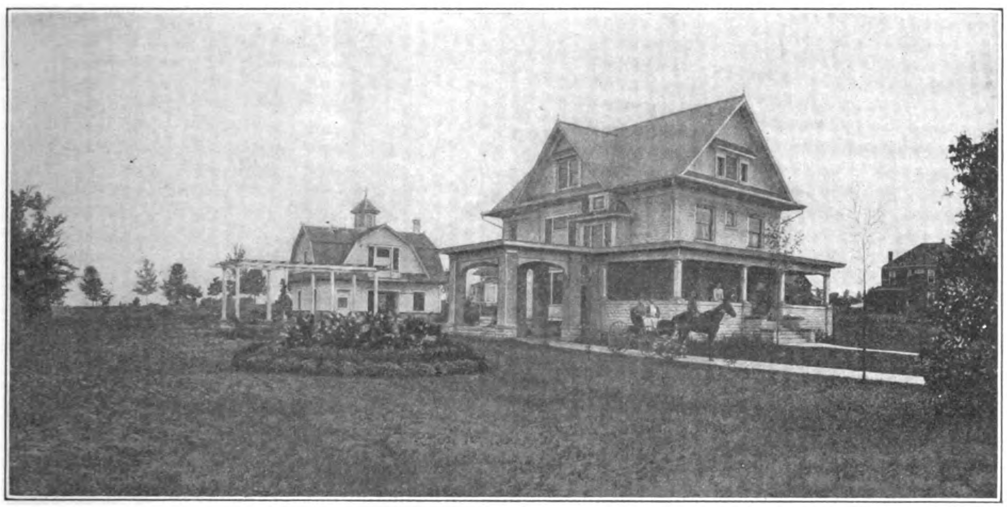
(With Supplement Plates.)

SO much has been said about the kind of houses which architects design for other people to live in that the thought often occurs as to what sort of a home an architect would plan for his own occupancy. Much of course depends upon the taste and temperament of the architect, and local conditions have not a little to do with the way in which the problem is finally worked out. A point also to be borne in mind is the varying degree of individual requirements which naturally exert a very important influence upon the number and arrangement of the rooms. An excellent idea of what one architect designed for a home of his own may be gathered from an inspection of the half-tone engravings, plans, elevations and details presented in connection herewith. The half-tone supplemental plates show among other things the appearance of the completed structure, with the carriage house and stable, also used as a garage, in the background. In addition there are presented three interiors, the lower one on the right hand supplemental plate representing the living room, the smaller one in the upper right hand corner the dining room, and the one in the upper left hand corner the "den" on the second floor.

being in accordance with the rules and regulations of the National Board of Fire Underwriters and city ordinances. The wiring along the brick walls is protected with iron



Billiard Room on Third Floor Fitted Up as a Sleeping Room.



General View of the House and Its Surroundings, with Horse Barn and Garage at the Rear.

A House of Granite Face Brick-Tile Veneer.—U. M. Dustman, Architect, Freeport, Ill.

Upon the first page of this article a sort of bird's-eye view of the building and surroundings is given, together with a view on the third floor of the house marked on the plan as a billard room, but at present utilized as a sleeping apartment. On another page is a view of the main stairway, clearly showing the style of trim, also a picture of the gas grate and mantel in the "den" on the second floor. The plans clearly indicate the general arrangement of the rooms on the several floors, while the details indicate constructive features.

The building is of balloon frame construction, with an outside veneer of Iowa brick blocks or tile with granite face, 5 x 10 in. in size and white in color. The gables are covered with siding, while the roof is of black Bangor slate.

The outside trim is white, with the sash painted black. The rooms on the first floor are finished in oak, with the exception of the kitchen, which with the rooms on the second and third floors are finished in birch. The floors are double, the rough one being of 6-in. fencing boards and the finish floors of ⅞ x 2 in. quarter sawed oak for the rooms of the first story, except the kitchen, which is maple. The finish floors in the second and third stories are of ⅞ x 2 in. selected red birch.

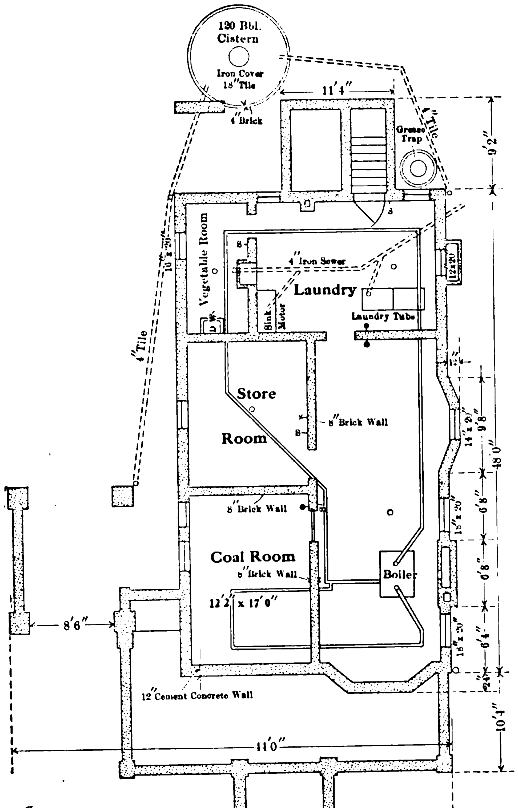
The house is wired for electric lighting, the wiring tubing and the woodwork with porcelain insulators. The cut-out box is lined with 10-lb. sheet asbestos, and in it is placed a double pole covered cut-out block properly fused and provided with an approved knife switch. The switches are of the Perkins flush snap type, having faces to match the hardware of the rooms in which they are placed.

The plumbing fixtures are of the J. L. Mott Iron Works make, the bathtub being white enameled inside and out. The water for the bathtub and shower is heated by a No. 10 Crescent water heater, made by the Humphrey Company, Kalamazoo, Mich.

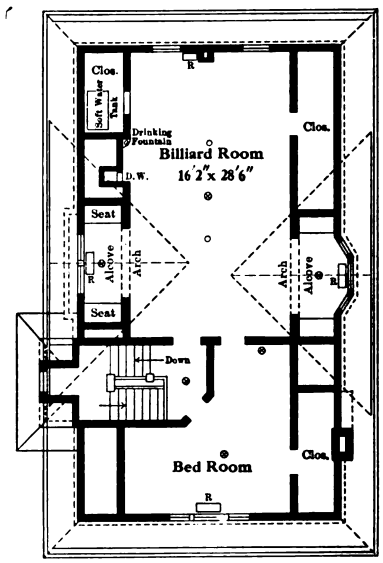
The heating of the house is by means of the vacuum steam system of the Kellogg-Mackay Company, Chicago, in connection with a Mott boiler, the latter being bricked in and all pipes covered with insulating material.

The residence here shown was designed by and built for U. M. Dustman, architect, Freeport, Ill. The brick tile used for veneer purposes was made by the Iowa Granite Brick Company, Clinton, Iowa, and the work of construction was executed by J. M. & H. H. Hineline, contractors, Freeport, Ill.

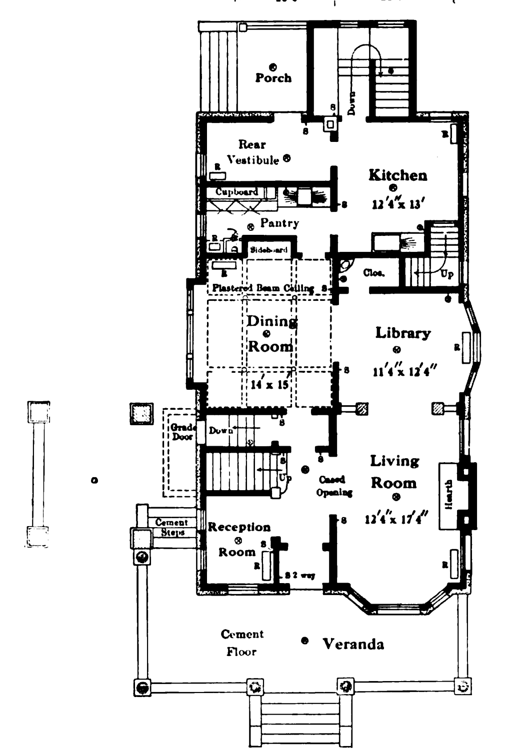
The carriage house and stable, shown just at the left and rear of the house on one of the half-tone supplemental plates, is 24 x 32 ft. in plan and has walls of cement concrete 4 ft. high, upon which is a frame structure covered with 5-in. siding and stained shingles. On the main floor of the building is a carriage room 18 x 24 ft. in area, a box stall 14 x 14 ft., a grainery and a closet, while on the second floor is the hayloft and a bedroom for the chauffeur or coachman.



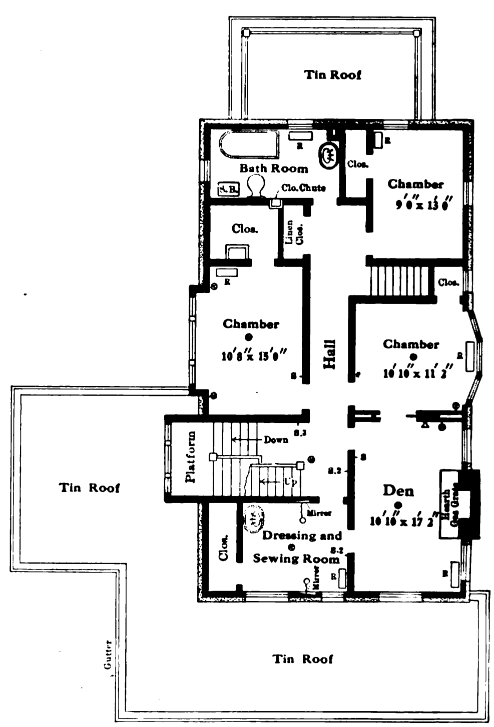
Foundation.



Third Floor.



First Floor.



Second Floor.

A House of Granite Face Brick-Tile Veneer.—Floor Plans.—Scale, 1-16 In. to the Foot.

Taking Off Quantities From Architects' Drawings.

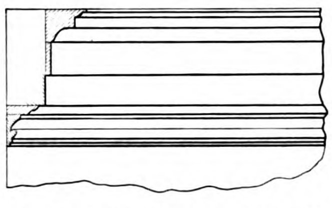
At a recent meeting of the Carpenter Contractors' Association of Cleveland a most interesting address was made by James Young, who described his method of taking off quanities from architects' drawings in order to furnish an estimate of cost. The subject is one of never-ending interest, and what Mr. Young had to say on that occasion contains so much of suggestive value that we present the following copious extracts:

The first thing I do when figuring a job is to give a general glance over the plans, elevations and specifications. Then I turn to the basement plan and take off the number of feet lineal of girder and its size, whatever it may be, posts, if any, and these follow the date, name of architect and owner, as my first entries. Then turning to the first floor plan, take the amount of sill in lineal feet, making an entry of that and how the sill is composed. I take that measurement accurately, by measuring the plan at its longest and widest square projection; thus, should the length be 58 ft. and the width 42 ft., we have 116 ft. and 84 ft., making the girth 200 ft. If there are any bays, add 3 ft. for each bay.

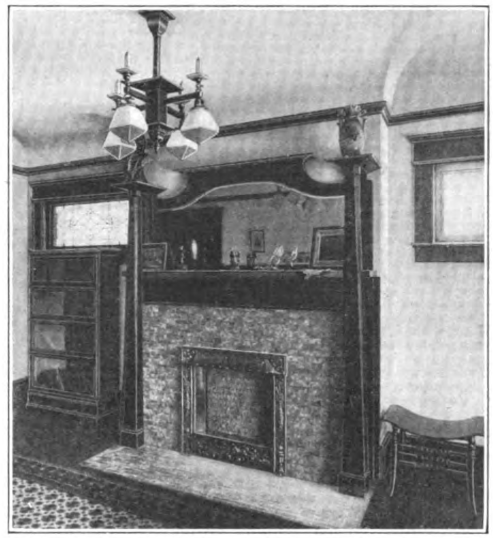
We have now not only the lineal measurement for sill, but also for studding, sheathing, &c. Then take the superficial area of the first floor for joisting, making the entry at whatever it may measure. For instance, first floor "1950, 2 x 10 x 16 x 19," thus indicating the number of square feet to be joisted, the size of the joist, the spacing and the average length.

Next turn to the second floor and do the same, making the same kind of entry, usually with some additions; for instance, there may be some bays or projections, which are only one story high, with girders running across at these openings. I take the amount of such girders and the size of bays or projections which stop at first floor, because if they are not covered by the second story joists they must have ceiling joists. Then there may be one or more projections thrown out on the second floor which are packed with mineral wool or otherwise treated. In addition, then, to the mere entry of joists for the second floor, there may be entries like these: "36 ft. 6 x 10 girder, 115 ceiling joists, 130 ft. 4 in. wool." The fact of the entry of wool carries with it the furring and sub-floors necessitated by its introduction. There may still remain other features on the second floor to be taken care of. The first floor may have a large living room, over which the joists are 2 in. wider than the balance of the house and set at 12-in. centers. Take the size of that room and make an entry like this: "Extra on 24 x 32, 2 x 12, 12," indicating that a portion of the second floor will have joist 2 x 12 set at 12-in. centers and 24 ft. long.

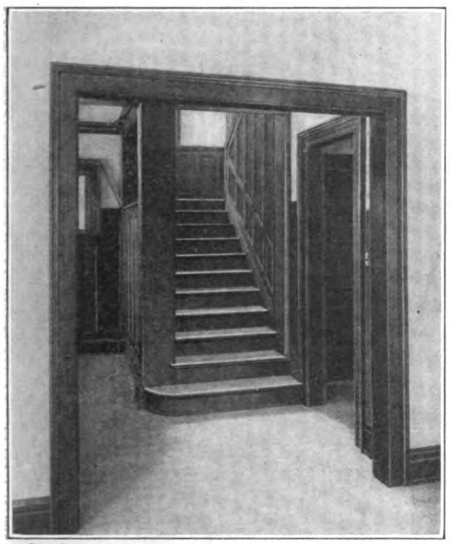
Having thus taken care of the second floor, next turn to the third floor or attic, and take the measurement of it. From the attic floor take the measurement of the roof and ceiling joists or collar beams. Unless it is an absolutely plain, straight roof I never measure it off the elevations, because I think I can measure a roof that is pretty well cut up much more accurately from the roof plan, and that in one fraction of the time required to measure each and every section or portion of roof as shown on the elevations. In the former case I know that I have got full quantity of roof, while I might be doubtful if I had by the latter method. No matter at what pitch a roof is it must bear some definite proportional



Detail of Beam Construction in Dining Room.



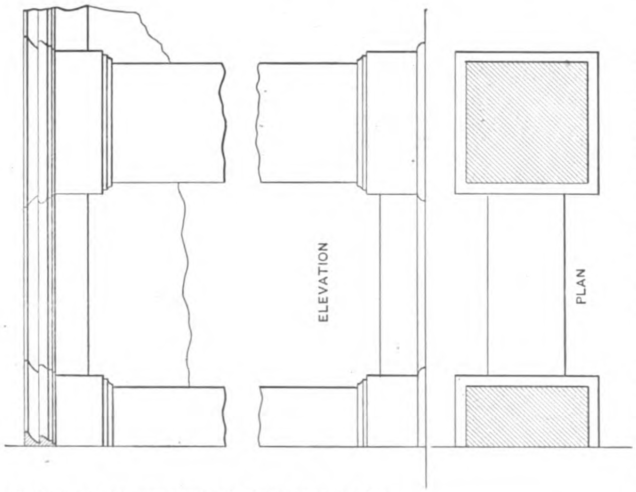
The Gas Grate and Mantel in the "Den" on Second Floor.



The Main Stairs, Showing Style of Trim.

Front Elevation.—Scale, 3-32 In. to the Foot.

A House of Granite Face Brick-Tile Veneer.—Elevation and Details.



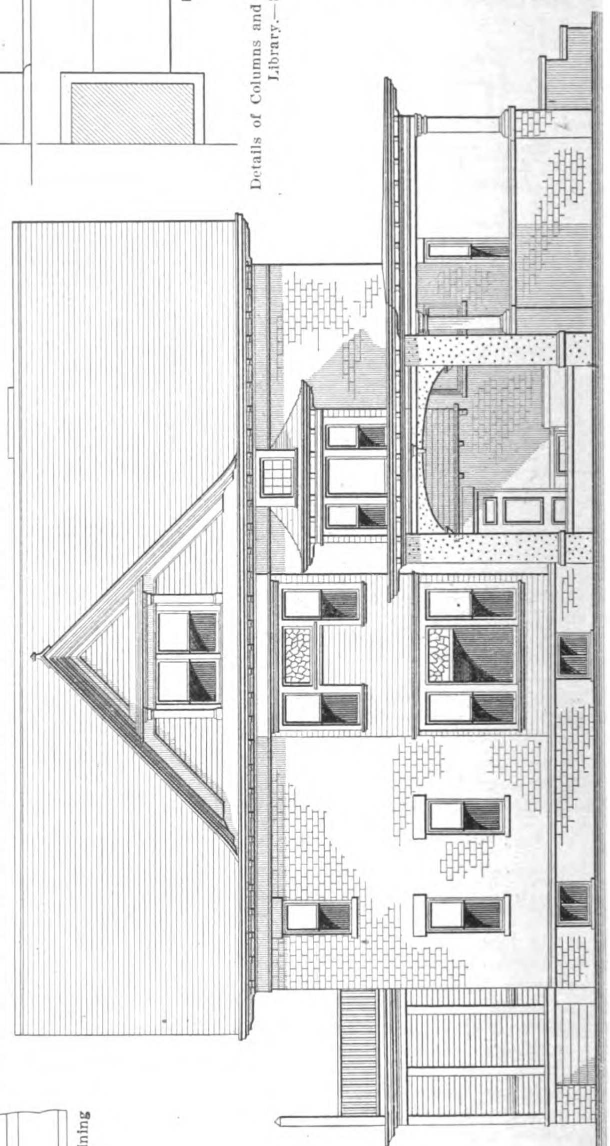
Details of Columns and Trim Between Living Room and Library.—Scale, ¾ In. to the Foot.

relation to the amount of plan area to be covered. The only thing necessary then, is to find the various proportional relations that different pitches bear per square to the plan per square to be covered. Having determined that, you decide it not only for one roof, but for all time; you have then before you the simplest of propositions, and one that can be absolutely relied upon. But this does not dismiss the matter of roof. For instance, the measurement of your attic floor for joist does not go beyond your plate line and your roof does. Then, again, there may be a deck 16 x 20 ft. I believe it is better to make the entry "16 x 20 ft." than "deck 320," because the former entry gives not only the area of the deck, but also the amount of deck plate, and I think it is particularly important to get a correct amount of the material that goes in a deck, because it is a question if the material in any other portion of a building costs as much to put in place.

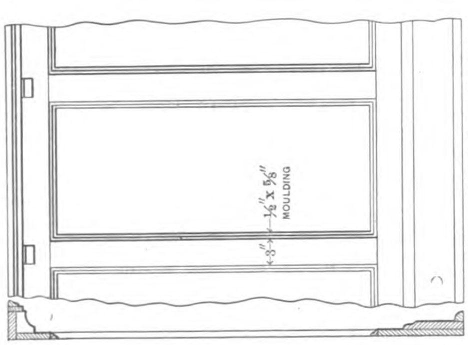
Having a deck, then, 16 x 20 ft., take 320 ft. off from the measurement of your roof plan, and you have the amount on which to apply your proportional relation. Count the number of dormers in a roof and allow so much additional per dormer, determining that amount at the time according to the kind of roof the dormers may have. One-half of the roof plan will give the amount of space required for collar beams as accurately as it may be obtained in any other way, and there can surely be no method quicker.

Then measure the cornices. The same cornice I measure from the attic plan, as it can be measured as accurately there, and more quickly, than by taking it from four elevations. I usually make a price per foot on the cornice at that time, embracing that portion of roof which it takes to cover it. The gable cornice I measure from the elevations, also making a price per foot on it. Then take the amount of dormer cornice; also take the number of feet of hip for cant boards or hip shingles, as the case may be.

Next turn to the walls. We already have the girth of the first floor. Take the girth of the second



A House of Granite Face Brick-Tile Veneer.—Side (Left) Elevation.—Scale, 3-32 In. to the Foot.



Details of Wainscot and Base in Dining Room.—Scale, ¾ In. to the Foot.

floor, and taking the mean between the two gives the girth for the total hight. My entry would be thus: "200 ft. of 2 x 5 x 22 stud and sheathing." Then take the final covering, whatever it may be, siding, shingles or timber work. If siding is used I run my eye over the number of corners on the first and second floors, add them together, multiply by half the hight and I have the number of feet of corner boards, or mitred corner, as the case may be. Then measure the gables and dormers. I usually put a higher price on gables and dormers than I do on the walls, because there is more waste and the work is slower.

Next take water table belting, if any, brackets, &c. I think it is well to put a price on these at the time, because it is difficult to make a note of them in such a way as to indicate their value. At this stage go back to the attic plan, making the entry "attic." If a sub-floor is used simply make the entry "sub"; if it is laid straight, follow the word "sub" by the abbreviation "diag." if the floor is laid diagonally.

Then measure the amount of finished floor, which is usually considerably less than the floor surface of the building, because the attic is usually studded in from the plate line. Then take the number of feet of partition lineally, the number of feet of base, the number of doors, hight, style and thickness, the number of windows to be cased, the number of closets and how treated, the number of feet of cupboards and whatever else appears on the first floor plan.

Next take the second floor in much the same way, the sub-floor, the finished floor, paper, furring, wool, if any of these are called for. If bathrooms are marked "tile" make an entry of so many feet of tile extra, because it costs considerably more to cut in floor between joists, fitting around pipes, than it does to lay it on top.

In measuring partitions always measure those running one way of the building first, then measure those running the opposite way. I think one is more apt to get a correct measurement by so doing than if he tries to measure them irrespective of the way they run.

Then take the number of doors, window sides, closets plain, closets with drawers, the number of feet of cupboard, the number of mantels, medicine cases, towel closets and whatever else may appear on the second floor plan.

If there is a room in hardwood take that by itself. If the hall is hardwood I will have an entry "extra on eight veneered doors, hall"; that implies that there must be jambs with hardwood edges and hardwood finish on one side, and then so many feet of hardwood base. I usually measure the hall by itself, in any case, because not infrequently it has a wood cornice, and you may not know whether it has or not until you are studying the three-quarter scale drawings.

The first floor I treat somewhat differently. One very serious drawback to taking off quantities of interior work of the first floor is due to the fact that in many cases there is only one set of three-quarter scale interior drawings, and they are kept in the office, so that it is impossible to take off the work of any one room intelligently.

For a number of years, unless the three-quarter scale drawings accompany the plans, I have adopted the following method: After taking the partitions and floors take each room by itself, because the style of finish may differ very materially in the different rooms. An opening in one room may be cased for three or four dollars, while that of another may be worth $10 or more.

My entries for these rooms, then, are as follows: "Living room, birch, three door sides, five window sides, 70 ft. base or wainscot, 110 ft. picture mold or cornice, 10 ft. of alcove beam, two corner pilasters, mantel." Take off each of the rooms and halls in this way, leaving two or three blank lines in the book between each room for the insertion of anything that appears on the interior drawings, but not shown on the plans.

Kitchens, pantries, store rooms, servants' dining room and rear halls I group the same as on the second floor, as invariably these are all of some one style. Then take the number of feet of cupboards and any other incidentals that may appear to be called for.

Then take off the stairs. Rear stairs from basement to attic. I usually put a value upon as I look at them on the plans. The main stairs I usually make a diagram of as to position of the newel, the start of the rail, the shape of the first two or three risers, the width of the stair, number of landing posts, the number of feet of level rail, which, of course, includes the well-hole casing. The raking rail will run about a foot to the tread. I make the price after seeing the style on which the stairs are built. I rarely ever lump a main stairs at so much. I figure a stair itself at so much per step, according to its design and the wood of which it is built; so much for the newel and each of the landing posts; so much per foot of rail, and so much additional for each ramp or casing.

After taking off the doors on the first floor and whatever work there is in the basement, I am done with the plans, so far as the interior work is concerned, I then turn to the elevations and take off the window frames. While I already have the number, that does not enable me to make a price upon them, as their value may vary materially. This is my method, taking each elevation consecutively: I put down on my pad the number of common double hung windows and then look at those which are special, and on them I put a value. The entry in my book then will be like this: "40 common windows, specials, $215." The only thing that is now left is porches and roofs and cornices of bays and balconies.

Porches I take by the square foot—so many feet of floor and ceiling, so many feet of roof, so many feet lineal of beams and cornice, so many posts, so many feet of rail, so many feet of lattice. Bay roofs and cornice I measure in with porch roofs and cornice, as they generally are of the same style and value. Balconies I take off as they may appear.

Having now completed taking off my quantities, my one object is to get the amount of surface I have to cover on the exterior and the nature of that covering, and in the interior to get the quantity and kind of the various items that go to make the complete whole. After having done this I read over the specifications carefully to see whether or not there may be something which I have overlooked in the more general reading at the first.

I have described the taking off of quantities of a frame residence, but taking off the quantities of a brick residence does not vary materially, although there is not so much to take off. There is one item which I always make an entry of on a brick residence which I do not make on a frame residence, that is scaffolding.

Coating Tin Roofs with Coal Tar.

The question was recently raised by a Kansas correspondent of the *Painters' Magazine* as to what would be the best treatment for a tin roof that had been coated for some time with coal tar. He stated that the tar could not be removed because its removal would open up leaks where the tin had rusted badly. Oil paint was tried, but it did not adhere to the tar. In some places the tar was 1/8 in. thick, and in other places the tin was bare. The tar on drying crawled in bunches, and on hot days the sun softened the tar.

The journal in question replied as follows: The best remedy would be a new roof, and if the roof is a flat one, a gravel and tar on top of this without removing the tin would be best. However, if the roof is gabled or if gravel roofs are not in use in that locality or if the owner does not want to go to the expense of a new roof, the very best thing to do is to wait until the tar becomes hard and then go over the roof with a stiff broom, removing whatever loose dried up tar may be there. Then coat the bare spots on the roof with liquid coal tar, to every gallon of which add 1/4 lb. air slaked lime (quicklime that has been permitted to fall into powder by exposure to the air and is then sifted) and 2 ounces of dry soda ash or pearlash. Stir thoroughly, and if the coal tar is too heavy thin with coal tar naphtha or turpentine. Do not use benzine or gasoline for thinning, as that makes it too brittle. Instead of one heavy coat, apply two thin coats. If some of this gets on the old tar it does not matter, as you can hardly spoil the appearance of the roof now.

HINGED TYPE RADIATORS are employed in the heating system of the Royal Infirmary at Manchester, England. The radiators are arranged to be swung outward from the walls to facilitate cleaning, and also when necessary to reach the fresh air inlets located immediately behind the radiators. The system is a forced circulation of hot water with hot water generators supplied with steam for heating the water.

A REINFORCED CONCRETE WORKSHOP.

BY PAUL T. LESHER.

IT is generally conceded that reinforced concrete is the most efficient and logical construction for buildings where permanence and fireproof qualities are prime requisites. The only perishable element, the reinforcement, is thoroughly bedded in the concrete and is, therefore, protected from all corrosive influences. Concrete is recognized by all as one of the best fire resisting materials used in building construction and it is impervious to all atmospheric influences. A reinforced concrete building is very rigid, there being practically no vibration.

A reinforced concrete workshop has six distinct advantages over other forms of construction, namely, absolute permanence, low insurance rates, comparative low first cost, superior fire resisting properties, rapidity of construction and use of local material and labor.

In the illustrations which are presented herewith is shown a small reinforced concrete workshop, with a plan of the roof reinforcement.

The roof slabs are 3 in. in thickness and are reinforced by ⅜ in. cold rolled corrugated round iron rods, spaced 6 in. center to center, the construction being clearly indicated in the detail of a slab. The slabs are supported by three beams and the end walls. The construction of these beams and the reinforcement used is also shown in the details. The walls are 6 in. thick and require a light reinforcement to prevent shrinkage and at the same time to give them stiffness while setting. All that is required in regard to this reinforcement are ¼-in. rods spaced about 24 in. on centers each way, as shown on the side elevation.

Where the beams occur the walls are made 10 in. thick for a distance of 15 in. on either side of the center line of the beam. The cross section through the workshop shows very plainly the thickness of the walls and the floor construction used.

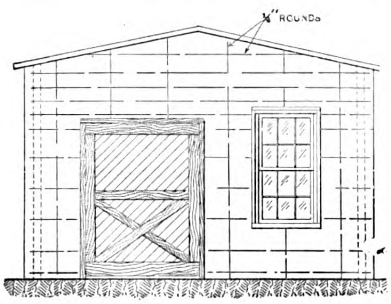
The door shown in the front elevation is of special construction, while all the windows and frames are of stock design and can be readily secured from the mill.

Provision may be made for shafting by placing bolts or sockets in the beams to connect with pillow blocks.

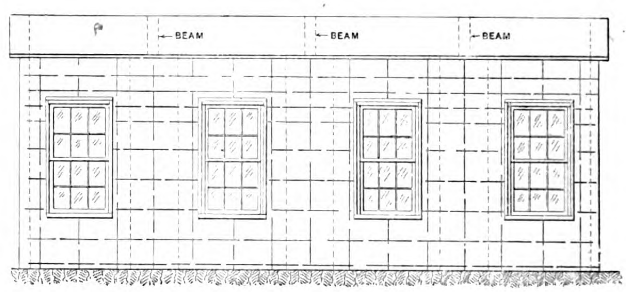
The "forms" should be sufficiently tight to prevent loss of cement and should be thoroughly braced or tied together so that the pressure of the concrete will not throw them out of place. They should be left in position until the concrete has attained sufficient strength to resist accidental thrusts and permanent strains which may come upon it. The "forms" should be thoroughly cleaned before being used again and the time for removal must be determined by weather conditions and actual inspection of the concrete.

The approximate cost of a building of the character indicated is divided about as follows:

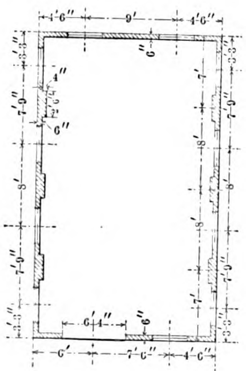
Excavation, $25; concrete and reinforcement, $400; forms, $60; floor planking, $50; labor, $120; windows, $55; door, $15; making a total of $725.



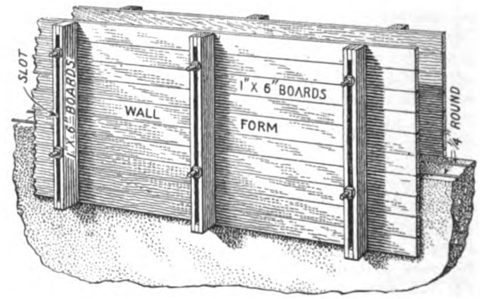
Front Elevation



Side Elevation.



Plan of Shop.



Perspective of a Section of Wall Showing Manner of Construction.

A Reinforced Concrete Workshop.

The foundations for the building are assumed to rest on dry clay. The concrete should be made in the following proportions; one part Portland cement, two parts sand and four parts of broken stone or gravel. Tar concrete should be laid under the floor planks, as cement concrete rots wood resting upon it.

A Safe Apprenticeship for Painters.

At the fifth annual convention of the Wisconsin State Association of Master House Painters and Decorators recently held at Madison, Wis., one of the papers presented had to do with the apprenticeship question as applied to painters, the author being Charles H. Webb. From what he had to say on the subject we present the following extracts:

In the consideration of any question pertaining to the business of the master painter two important things, it seems to me, should be considered. First, are we now doing it by the best system possible? Second, as we are now carrying out the system, is it as popular with the general public, or that part of the general public that is most vitally interested, as it might be if we were to revise our system?

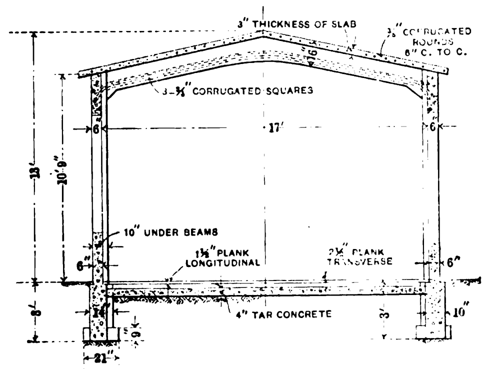
A few years ago a committee of painters in one of the Eastern States worked a long time on the apprenticeship question and finally presented a complete system and set of rules. The work of this committee was adopted by the New Jersey State Association and put into practice. It was so far ahead of any former apprenticeship system for painters that it attracted the attention of master painters throughout the country.

The matter was brought before the International Association at the Milwaukee convention and, with a few needed modifications, was adopted as the apprenticeship of the international body, with the recommendation that it be put into use in all the State and local bodies throughout the United States and Canada. Since that time some changes have been made in the system, most of them having as their object the making of the system more popular, especially with boys and young men, who it was hoped would become more interested in learning the painting business.

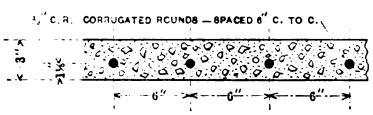
voted to giving him instruction is very limited. During the busy season the shop man has practically no time for giving him instruction, and if the apprentice learns anything at all he must do so by observation, and while this is a lasting benefit it is slow.

For many years the master painters of Chicago have wrestled with this problem of apprentices, and they have at last hit upon a plan that, it seems to me, would produce desirable results if combined with the apprenticeship system and the whole were adjusted on a safe and sane basis. I refer to the Chicago School of Painting and Decorating, an institution that was started by the local association of Chicago something over a year ago. The instructors in this school being successful, practical master painters, give their undivided attention and time for 8 hr. each day to giving systematic instruction to the pupils. Each pupil is taught and does all his work in a room by himself, and is not held back in classes, but is pushed ahead as fast as his ability will permit.

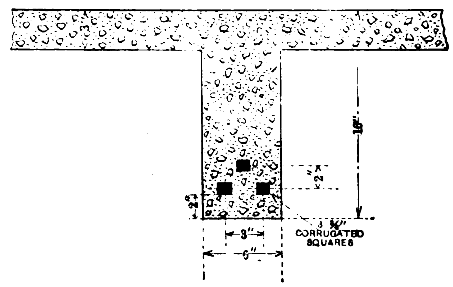
The system of instruction is simply the application of



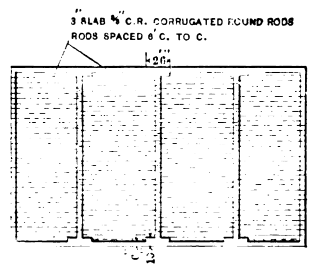
Vertical Cross Section of Workshop.



Section of Roof Slab.



Detail of Concrete Roof Beam.



Plan of Roof Reinforcement.

A Reinforced Concrete Workshop.

We all feel the need of more competent mechanics among the painters, and deplore the painful fact that there are not more bright young men in every shop in our land who are serving their apprenticeship and anxiously looking forward to the day when they shall grace our honored calling as "workmen that needeth not to be ashamed." They are not there, however, and we may well ask ourselves, "Why?"

So far as my own observation goes, I think it is due largely to four causes: First, the short season during which the journeyman painter can hope to find steady employment; second, the rules of the union limiting the number of apprentices; third, the more promising conditions in other trades; fourth, the length of time, under the present system, required to learn the painting and decorating business. To the above may also be added the fact that few master painters care to bother with apprentices under present conditions and that the shop men and journeymen who will try to teach an apprentice anything are scarcer than hen's teeth.

It has always seemed to me that since the thing sought to be accomplished in any apprenticeship system is the production of competent workmen, if it is possible to produce competent workmen in less time than is now required, it would be right and proper to revise our apprenticeship system accordingly. You all know that while an apprentice is working in a shop the time de-

the principles of order, system and concentration to the matter of learning the business.

In such a school an apprentice will learn more in a week than he would in the paint shop in several months. By combining shop experience with such a trade school as the one referred to above it will be possible to greatly reduce the length of time required to serve an apprenticeship. Schools like the above may be started so economically that any town with three or four master painters can have one if some of the masters will volunteer to teach.

If, instead of requiring apprentices to serve three or four years, they are given the benefit of the day classes in a practical trade school for three months or of the night classes for six months, you will find that you can produce better, cleaner, more orderly mechanics in two years than are turned out under the long term system that is now in vogue, and I believe that when young men see that they can learn the painting and decorating business in two years, and at the end of that time be able to make a success of their work, they will be more willing to enter the ranks of the brush wielders and we will not be compelled to depend upon foreign countries for our workmen.

If you will take the trouble to investigate, you will find that the reason we get so many skilled mechanics from abroad is because in the European countries apprentices are given the benefit of trade schools and an old-fashioned apprenticeship as well, and I think the application of this principle in this country would do much toward solving the problem of replenishing the supply of skilled painters as the present generation of journeymen become too wealthy or too old to work. Certainly when we remember that the shops in Chicago are limited by the rules of the union to one apprentice for every twenty or twenty-five journeymen, we cannot console ourselves with the thought that as the journeymen of today pass on there is any great army of apprentices coming on to take their places.

A Mill Building of Cement Brick.

A mill building which possesses the unique feature of being constructed entirely of cement brick made upon the ground has lately been completed not far from the site of the landing of the Pilgrim Fathers in 1620. The concern for which the building was erected owned a large bank of clean sharp silicious sand and a bed of gravel containing a liberal per cent. of stone, and it was therefore decided after some preliminary tests of the material to use cement brick. The mill is two stories and basement in hight and covers an area approximately 114 x 430 ft. The bricks were made in four Standard cement brick machines operated by hand, each machine turning out 20 brick at a time.

The mixture generally used was one part cement and three parts sand, although for lightly loaded walls a few brick were made in the proportion of one of cement to four of sand. All brick used on the outside of the building had a facing ⅛ in. thick of one part cement and two parts fine sand, with the addition of 2 per cent. waterproofing for the cement.

In doing the work enough water was used to make a mortar of such consistency that it would hold its shape under compression without flushing water to the surface so as to cause the mortar to stick to the plates. The amount of water used averaged about 8 per cent., and although this amount would seem likely to produce a porous brick, it was shown by tests that the brick so made were quite impervious to moisture. The cement brick formed such perfect bond with the mortar that the resulting wall was practically monolithic. A valuable and interesting feature in connection with the cement brick is the ability to cut it for special places, it being possible to make a cut ½ in. thick for the full length of the brick and width.

For the entire construction work about 2,400,000 cement brick were used, requiring in the making nearly 7500 bbl. of cement. The building is of a mild gray color, and while the possibilities of ornamental work with molded brick and concrete castings are unlimited they were not tried in the present instance except as an experiment, for the general design of the building did not call for such detail.

As compared with clay brick, the cement brick show strength under compression of 40 lb. more per square inch and a resistance to disintegration by sand and rain which does not exist in the case of the former.

The new building is known as mill No. 3 and was erected by the Plymouth Cordage Company at Plymouth, Mass., to meet the requirements of its growing business. The two other mills of the company were constructed of clay brick, but when the third one was planned the price of such brick was so high as to cause the experiment to be made of using cement brick, but which, it must be understood, is not concrete brick.

Effect of Air and Moisture Upon Steel Reinforcement.

The increased use of reinforced concrete in every description of structural work lends interest to a series of tests which have just been carried out in Germany with a view to ascertaining whether air and moisture entering through the ordinary tension cracks, that cannot be avoided, will cause rusting of the steel reinforcement. The results tend to show that when the steel reinforcement has not been stressed to beyond its elastic limit the cracks formed in the concrete are insufficient to cause rusting, says an exchange. For carrying out the tests beams 6 ft. 3 in. by 8 ft. 6 in. in cross section and about 59 in. long, with the various kinds of reinforcement in general use, were prepared. In each case the steel was situated 1¼ in. above the bottom of the beams and formed from 1.03 to 1.31 per cent. of the area above the center line of the steel.

The concrete was mixed in 1 : 2 : 4 ratio, and 10.1 per cent. of water was added. It was found that this amount was sufficient to give a quite plastic mass. The forms were not removed until 24 hr. had elapsed.

For three months the beams were then stored, some in the open air and some in wet sand, and water was sprinkled over them every day. During the next three months load tests were made on the beams with a view to finding the various physical properties of reinforced concrete beams—viz., first point of cracking, stress in concrete, stress in steel and ultimate strength. Of the total of 58 beams made, 26 were broken during the tests. The remaining beams underwent a rapid rusting test under load, which was usually about the same as that to which the beam had been previously subjected. This load varied from considerably below up to the elastic limit. The gear consisted of levers for applying a fixed load to the beam at two points, and a mixture of carbon dioxide, oxygen and water vapor was passed through a sheet iron casing fixed round the middle third of the beam. In the greater number of cases the beams were kept in the rusting atmosphere from 7 a.m. to 4 p.m. for three consecutive days. The concrete below the steel was then chipped off, and the steel examined. In 27 cases no rusting at all was observed. All these beams had been subjected to loads causing stresses in the steel varying from 18,000 to 35,000 lb. per square inch. Where the steel had been stressed from 35,000 to 44,000 lb., rusting was found to have taken place. The cement makers state that the composition of the cement used in the tests was as follows: Silica, 21.86 per cent.; alumnia and iron oxide, 10.3 per cent.; lime, 62.5 per cent.; magnesia, 1.67 per cent.; sulphuric acid, 1.69 per cent. On ignition it was found to lose 132 per cent., and the specific gravity was 311.45.

Government Transfers Work of Forest Products Investigation.

Preparations have been completed for the transfer of all the Government's forest products work to Madison, Wis., where the United States Forest Service Products Laboratory will be located, and to Chicago, where the headquarters of the office of wood utilization will be established.

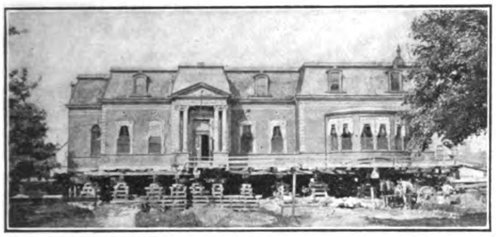
The new forest products laboratory being erected at Madison by the University of Wisconsin, which will cooperate with the Government in its forest products work and which is to cost approximately $50,000, is now in the course of construction. The laboratory will be a fireproof building of brick trimmed in white stone and is located near the Chicago, Milwaukee & St. Paul Railroad, with exclusive tracks and other railroad facilities. The building is expected to be ready for occupancy the first of the year. In the meanwhile temporary offices will be located at 1610 Adams street, Madison, Wis.

On October 1 the Yale Timber Testing Laboratory was discontinued and the forest service equipment there shipped to Madison. The laboratory at Washington was discontinued at the same time. The timber testing laboratory at Purdue, Ind., will be operated until the middle of December, when it will be discontinued and its equipment shipped to Madison.

THE CONTRACT for the new 12-story office building and theater to be erected on the site of the old buildings at the southeast corner of Broadway and Forty-third street, New York City, has been awarded to the Gray Construction Company of the city named.

MOVING A PUBLIC LIBRARY BUILDING.

NOTABLE operations involving the moving of large and heavy buildings from one site to another are always interesting to the builder, as in many sections of the country he is often called upon to do work of a somewhat similar nature, although upon a much less pretentious scale. As a general thing, however, large undertakings are carried out by those making a specialty of this work and who are expert shorers and movers. Many examples of house moving operations have been referred to in the past in these columns, some being of a comparatively simple nature, while others have been of a character calling for great engineering skill. A recent instance involving the moving of a building without in any way interfering with its use by the general public was that of the town library in Brookline, Mass. The town authorities decided to erect a new building on the site of the old structure, so the latter was moved 100 ft. to one side of the old location, then lowered 4½ ft. and moved 80 ft. to the front and placed upon a temporary cellar constructed for its use.



Moving a Public Library Building.—Fig. 1.—Front View of Building While Being Lowered 4½ Ft.

The building was very irregular in shape, with heavy interior walls, the extreme length of the structure being 138 ft. and the extreme breadth 104 ft. The library contained about 70,000 volumes and the total weight of the building and contents was estimated at about 2000 tons. From this it will be seen that somewhat unusual difficulties were involved in the work, one feature being the rambling character of the building and the uneven distribution of loads upon its walls and floors.

Before moving the building it was necessary to place supports under it in the form of heavy timbers. Holes were cut through the walls and piers below the first floor and through these were placed the timbers and I-beams. After the I-beams were in position the weight of the building was taken off of the piers by making use of 455 jack screws, which were disposed according to the load. The lower set of timbers were 12 x 12 in. hard pine placed about 10 ft. on centers throughout the entire length of the building and parallel to one another.

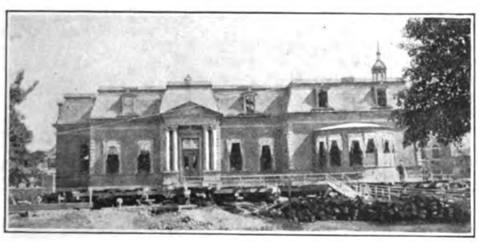


Fig. 2.—Front View While Being Moved Forward.

These were main timbers through which the load of the building was transmitted to the rolls and slides. Immediately above these main timbers and running at right angles to them were placed other timbers about the same size, and at intervals of about 10 ft. on centers. These timbers formed supports for the walls that ran at right angles to them, there also being placed between each an additional short timber or needle, thus giving the walls a point of support every 5 ft. Walls that ran parallel to these timbers were supported by needles placed about 5 ft. on centers.

Just below the main timbers were placed shoes of oak, and below them were the rolls and slides. The latter ran on 12 x 12 in. timbers supported on a crib work of blocking, and were placed about 10 ft. on centers in both directions. Where the load was greatest rolls were used, these rolls being 8 in. in diameter and 4 ft. long—four being used under each shoe. The rolls were arranged to run on two 6 x 6 in. oak ways, about 2½ ft. apart; also supported by a crib work of blocking. All rolls and slides were placed level in parallel rows.

About one-half the building was carried on rolls and half on slides. The shoes were of oak 12 in. wide, 4 in. thick and 5 ft. long, while the slides were of hard pine 10 ft. long, 10 in. wide and ½ in. thick.

The energy required to move or push the building was supplied by long steel screws turned by manual labor. There were 24 jacks in use, each 3 in. in diameter and each having a throw of 18 in. A man was stationed at each jack and upon a given signal gave a quarter turn at a time. By this arrangement the rate of movement was about 5 to 8 ft. per day. The public had access to the building by means of movable plank walks; telephone and electric lights were maintained by means of flexible cables, while water connection was made with hose.

The illustrations which are presented herewith are direct reproductions of photographs taken during the progress of the work. The operations were commenced on June 18 and completed October 15, 1909. The building was moved off the old foundation July 12 and was placed on its new foundation September 29, thus occupying just two and one-half months in the operation of moving. The contractors who executed the work were Isaac Blair & Co., Boston, Mass., and the architect for the new structure is R. Clipston Sturgis of the city named.

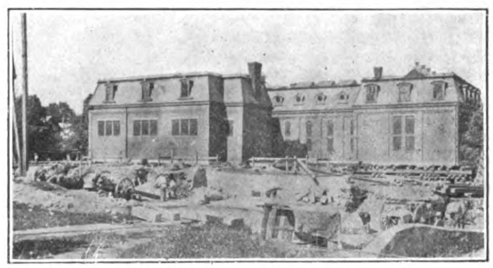


Fig. 3.—Side View of Building While Being Moved Toward the Left.—A Portion of the Old Cellar Is Seen in the Foreground.

Instruction in Heating and Ventilation in New York City.

A course of instruction in heating and ventilation has been inaugurated by the Harlem branch of the Young Men's Christian Association, New York City, located at 3 West 125th street. It is intended especially for builders, mechanics and salesmen of heating appliances, and is intended to cover in a practical and comprehensive manner the designing of heating and ventilating apparatus. Details in regard to the design and construction of all component parts will be covered as far as possible, as well as the erection and operation of complete systems. It is planned to have the class meet on Saturday evenings at 7.45 p.m., and the instructor is James A. Donnelly, a man who has been identified for years with the heating and ventilating industry and who is a member of the American Society of Heating and Ventilating Engineers. The fee is $12 for the two terms or $7 for one term, and may be paid in installments. Details can probably be obtained by applying to Maynard A. Clemens, educational director at the association building, or to Mr. Donnelly, 132 Nassau street, New York City.

Exhibitors at the Coming Cement Show in Chicago.

At the drawing for space at the third annual cement show, to be held in Chicago, February 18-24, 1910, and which took place on October 29 in the offices of the Cement Products Exhibition Company, the entire main floor and annex space in the big Coliseum was taken and over 30 concerns were unable to secure accommodation. This is the only instance where the entire available exhibition space has ever been taken so far in advance of the time of the display, and it is a condition which points to widespread interest in the show. About 185 companies filed applications before the first drawing and the 50,000 sq. ft. of floor space was assigned to 150 of these.

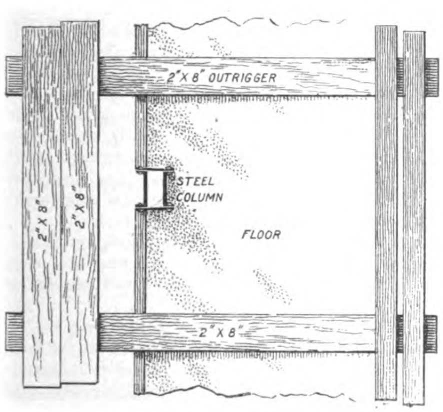
The exhibitors who secured space in the first drawing are as follows, the arrangement being alphabetical rather than the order in which they drew for space:

The Advance Mixer Company, Jackson, Mich.
Alpha Portland Cement Company, 204 Dearborn street, Chicago, Ill.
American Cement Roofing Company, Columbus, Ohio.
American Contractor Publishing Company, 40 Dearborn street, Chicago, Ill.
American Hydraulic Stone Company, Railway Exchange Building, Denver, Colo.
American Pulverizer Company, St. Louis, Mo.
American Steel & Wire Company, 115 Adams street, Chicago, Ill.
American System of Reinforcing, Chicago, Ill.
Anchor Concrete Stone Company, Rock Rapids, Iowa.
Architectural Stone Company, Cincinnati, Ohio.
Arrowsmith Concrete Tool Company, Arrowsmith, Ill.
Ashland Steel Range & Mfg. Company, Ashland, O.
Association of American Portland Cement Manufacturers, Philadelphia, Pa.
Atlas Portland Cement Company, 30 Broad street, New York.
Ballou Mfg. Company, Belding, Mich.
Barrett Mfg. Company, First National Bank Building, Chicago, Ill.
Barton System of Reinforced Concrete Construction, The, Medinah Building, Chicago, Ill.
Besser Mfg. Company, The, Alpena, Mich.
Bolte Mfg. Company, Kearney, Neb.
Brown Hoisting Machinery Company, Cleveland, Ohio.
Cement Age, 30 Church street, New York.
Cement Era, Monadnock Block, Chicago, Ill.
Cement Machinery Company, Jackson, Mich.
Cement Record, The, Kansas City, Mo.
Century Cement Machine Company, Rochester, N. Y.
Ceresit Waterproofing Company, 115 Adams street, Chicago, Ill.
Chain Belt Company, Milwaukee, Wis.
Chappelow, C. W., Munsey Building, Washington, D. C.
Chase Foundry & Mfg. Company, The, Columbus, Ohio.
Chicago Architectural Photographing Company, Marquette Building, Chicago, Ill.
Chicago Builders' Specialties Company, Chamber of Commerce Building, Chicago, Ill.
Chicago Cement Products Company, 3951 Lowe avenue, Chicago, Ill.
Chicago Concrete Machinery Company, Old Colony Building, Chicago, Ill.
Chicago Concrete Tool & Specialty Company, 56 Fifth avenue, Chicago, Ill.
Chicago Monolith Construction Company, 3936 Lincoln avenue, Chicago, Ill.
Chicago Portland Cement Company, Stock Exchange Building, Chicago, Ill.
Clark Publishing Company, Myron C., Chicago, Ill.
Climax Company, 131 La Salle street, Chicago, Ill.
Clinton Wire Cloth Company, 30-32 River street, Chicago, Ill.
Clover Leaf Machine Company, South Bend, Ind.
Collins & Co., W. A., First National Bank Building, Chicago, Ill.
Concrete Age, The, Atlanta, Ga.
Concrete Engineering, Caxton Building, Cleveland, Ohio.
Concrete Publishing Company, Newberry Building, Detroit, Mich.
Corrugated Bar Company, St. Louis, Mo.
Cowham System of Portland Cement Mills, Jackson, Mich.
Cropp Concrete Machinery Company, 84 La Salle street, Chicago, Ill.
Crown Point Spar Company, Inc., 21 N. Fourth street, New York.
David Williams Company, 14 Park place, New York.
D. & A. Post Mold Company, Three Rivers, Mich.
Decorators' Supply Company, Archer avenue and Leo street, Chicago, Ill.
De Smet, Geo. W., Chamber of Commerce Building, Chicago, Ill.
Dexter Bros. Company, 105 Broad street, Boston, Mass.
Diamond Concrete Machinery Company, Chamber of Commerce Building, Chicago, Ill.
Dietrichs' Clamp Company, Little Ferry, N. J.
Dodge Mfg. Company, Mishawaka, Ind.
Dunn & Co., W. E., 1328 Grand avenue, Chicago, Ill.
Dunn Mfg. Company, Allegheny, Pa.
Engineering News, Monadnock Block, Chicago, Ill.
Engineering Record, Old Colony Building, Chicago, Ill.
Eureka Machine Company, Lansing, Mich.
Eureka Stone & Ore Crusher Company, Cedar Rapids, Iowa.
Foote Concrete Machinery Company, 184 La Salle street, Chicago, Ill.
Fillmore Machinery Company, 512 Race street, Cincinnati, Ohio.
Garden City Sand Company, Chamber of Commerce Building, Chicago, Ill.
Gauntt Mfg. Company, F. G., Fort Wayne, Ind.
German-American Portland Cement Works, Chicago, Ill.
Gould, E. E., 3937 Grenshaw street, Chicago, Ill.
Groh Brothers, Kendallville, Ind.
Grumman Concrete Machinery Company, Zanesville, Ohio.
Hall-Holmes Mfg. Company, Jackson, Mich.
Hayden Automatic Block Machine Company, Columbus, Ohio.
Hill Clutch Company, The, Cleveland, Ohio.
Hohn Cement Brick Machine Company, Indianapolis, Ind.
Hough Company, Wm. B., Chicago, Ill.
Hunt & Co., Robt. W., The Rookery, Chicago, Ill.
Hydrolithic Cement Company, 138 Jackson Boulevard, Chicago.
Ideal Concrete Machinery Company, South Bend, Ind.
Illinois Improvement & Ballast Company, 115 Adams street, Chicago, Ill.
Inman Concrete Building Block Machine Company, Beloit, Wis.
Ironite Company, 84 La Salle street, Chicago, Ill.
Kelley Island Lime & Transport Company, Cleveland, Ohio.
Kent Machine Company, Kent, Ohio.
Kent Mill Company, 170 Broadway, New York.
Kerlin Automatic Post Machine Company, Delphi, Ind.
Knickerbocker Company, Jackson, Mich.
Koehring Machine Company, Milwaukee, Wis.
Kramer Automatic Tamper Company, Peoria, Ill.
Lehigh Portland Cement Company, Cleveland, Ohio.
Link Belt Company, Thirty-ninth and Stewart avenues, Chicago, Ill.
Lock Joint Pipe Company, 195 Broadway, New York.
Manufacturers' Record, Baltimore, Md.
Marblehead Lime Company, 55 State street, Chicago, Ill.
Marquette Cement Mfg. Company, Marquette Building, Chicago.
Marsh Company, Old Colony Building, Chicago, Ill.
Mateer Brothers Company, Washington street, Joliet, Ill.
McIlroy Belting & Hose Company, 129 N. Canal street, Chicago.
Meacham & Wright Company, Corn Exchange Bank Building, Chicago, Ill.
Miracle Pressed Stone Company, Minneapolis, Minn.
Miles Mfg. Company, Jackson, Mich.
Monolith Steel Company, Washington, D. C.
Moore & Son, W. D., Creston, Iowa.
Municipal Engineering & Contracting Company, Railway Exchange Building, Chicago, Ill.
National Fireproofing Company, 115 Adams street, Chicago, Ill.
Northwestern Expanded Metal Company, 84 Van Buren street, Chicago, Ill.
Ohio Ceramic Engineering Company, First National Bank Building, Chicago, Ill.
Overturf & Co., C. W., Dumont, Iowa.
Peerless Brick Machine Company, Minneapolis, Minn.
Raber & Lang Mfg. Company, Kendallville, Ind.
Radford Publications, Medinah Temple, Chicago, Ill.
Raggie, Chas. A., 3219 South Park avenue, Chicago, Ill.
Raymond Concrete Pile Company, 135 Adams street, Chicago, Ill.
Rock Products, 355 Dearborn street, Chicago.
Ross & Co., J. A., 84 La Salle street, Chicago, Ill.
Sandusky Portland Cement Company, Sandusky, Ohio.
Sanford Concrete Machinery Company, Toledo, Ohio.
Sharon Steel Hoop Company, 115 Adams street, Chicago, Ill.
Sioux City Cement Machinery Company, Sioux City, Iowa.
Simpson Cement Mold Company, Columbus, Ohio.
Skillins & Richards Mfg. Company, 127 Fulton street, Chicago.
Smalley & Trulin, Panora, Iowa.
Smith Company, The T. L., Old Colony Building, Chicago, Ill.
Smith Wire & Iron Works, F. P., Lake street, Chicago, Ill.
Snell Mfg. Company, R. Z., South Bend, Ind.
Somers Brothers, Urbana, Ill.
Standard Asphalt & Rubber Company, First National Bank Building, Chicago, Ill.
Standard Scale & Supply Company, 23-25 North Canal street, Chicago, Ill.
Sterling Pattern Works, Sterling, Ill.
Sterling Wheelbarrow Company, Milwaukee, Wis.
Stocker Concrete Material Washer Company, Highland, Ill.
St. Paul Cement Machinery Company, St. Paul, Minn.
Sturtevant Mill Company, Boston, Mass.
Svensen-Shuman Machinery Company, Bessemer Building, Pittsburgh, Pa.
Taylor Iron & Steel Company, High Bridge, N. J.
Toledo Wheelbarrow Company, 35-37 River street, Chicago, Ill.
Troy Wagon Works Company, Chamber of Commerce Building, Chicago, Ill.
Trussed Concrete Steel Company, Detroit, Mich.
United Cement Machinery Mfg. Company, Plain City, Ohio.
Universal Portland Cement Company, 115 Adams street, Chicago.
U. S. Champion Cement Roofing Tile Company, 523 Locust street, Kansas City, Mo.
U. S. Gas Machine Company, Muskegon, Mich.
U. S. Gypsum Comypany, 200 Monroe street, Chicago, Ill.
Van Hook, F. P., Boise, Idaho.
Wabash Portland Cement Company, Detroit, Mich.
Waterloo Cement Machinery Company, Waterloo, Iowa.
Williams Patent Crusher & Pulverizer Company, Old Colony Building, Chicago, Ill.
Wolverine Portland Cement Company, Coldwater, Mich.
Wisconsin Lime & Cement Company, Chamber of Commerce Building, Chicago, Ill.
Zelzer Brothers, Berwick, Pa.

A SIMPLE SCAFFOLD FOR IRON WORKERS' USE.

THE construction of the steel skeleton frame buildings which have come to be such a prominent feature of the architecture of the larger cities of the country has developed many interesting expedients for facilitating the work which at innumerable points must necessarily be executed under somewhat difficult conditions. In hot riveting the supporting columns, especially those which are to be enclosed by the curtain walls of the structure, it is necessary for the workmen to operate from a point just outside the line of the building, this being particularly the case with the housesmith who holds a hammer against the head of the hot rivet while the other end is being upset by a riveting gun. To conveniently do this work it is essential to have a supporting platform upon which the workmen can stand or sit, according to the requirements of the case, and one which is of such construction that it can quickly and easily be put up and taken down. In the accompanying illustrations we show a simple scaffold of this kind as it appears in use in connection with the riveting of one steel column to another, upon which it is supported. Fig. 1 represents a plan view and Fig. 2 a side view of this novel and convenient scaffold.

From an inspection of the illustrations it will be seen that the emergency scaffold, as it may be described, is well adapted for the use of housesmiths, iron setters and bridgemen, consisting as it does of two or more planks placed on each side of an iron column, so as to form outriggers. These are of 2 x 8 in. plank, a portion of which rests upon the floor of the building, while the other ends project beyond the line of the structure a sufficient distance to allow of one or more 2 x 8 planks to rest across the ends, constituting a platform upon which the workmen may stand for the purpose of assisting in the riveting of the columns. The outriggers upon which the platform rests are prevented from tipping or tilting by having one or more steel I beams or channels placed



A Simple Scaffold for Iron Workers' Use.—Fig. 1.—Plan View, Showing General Arrangement of Parts.

across their inside ends to act as a counterpoise to the weight of the man and materials on the projecting ends.

An inspection of the plan will clearly show the arrangement of plank and I beams for the purpose. The platform is made of two or more scaffolding planks formed edge to edge in the usual manner. This scaffold can be constructed in a few minutes; is safe and most economical, and for front or rear work in connection with a building it is admirably adapted to the purpose.

ACCORDING to a recent report of Consul-General G. N. West at Vancouver, British Columbia, steel frame construction in connection with bank buildings and those intended for other business purposes is growing in favor and is being used in buildings ranging all the way from 5 to 13 stories in hight. These and nearly all other new buildings have cement rubble concrete foundations. A few business structures and many dwelling houses are built of concrete blocks.

Why a Brick Building Costs More Than Frame.

When a frame store or residence is built the owner thinks that any man handy with a hatchet can erect it. He is usually an inexperienced man with no financial standing and the owner considers it safer to buy the material himself. The lumber bill is made out by the so-called contractor and is bought by the owner; the extra lumber bill often amounts to more than the original figures, says A. C. Ochs in *Brick*. This contractor sticks a few stones under the sides and ends of the

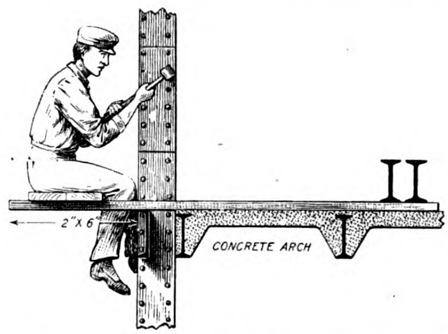


Fig. 2.—Side Elevation of Scaffold, Showing Workman Holding Hammer While Riveting Gun Is In Use.

building for a foundation; a small hole in the middle, stoned up with a few "niggerheads," serves the purpose of a cellar. Instead of using 2 x 14 x 12 in. on centers, 2 x 8 x 16 in. on centers are used for joists, with a sill through the center. The front is a cheap affair—no plate glass, the cheapest kind of roof is used, and the floor is of single thickness and of soft boards. When the owner decides to erect a brick building he thinks that such a building will cost him a great deal of money and he does not feel like saving on little things such as joists, floors, glass and basement; he wants a cement floor in his cellar ,and it must be drained. It is these seemingly little things that make his building so much more expensive rather than the brick construction.

The brick walls of a two-story brick building 25 x 70 ft. (say on an average 26 ft. high), with walls 14 in. thick, figuring brick at a cost of $7.50 per M, sand costing 75 cents per yard and lime 85 cents per barrel, all laid up with good mortar, will cost not more than $1450. This includes all labor and material, and also a pressed brick front. Now, how can you save much at the present price of lumber if you want to build these walls of lumber in a first-class manner, lath them inside and paint them with three coats of paint on the outside?

The writer has rebuilt a Western town in Yellow Medicine County, Minn., which was almost totally destroyed by fire in the year 1893. The following year, 1894, he built 24 solid brick stores, and a year later four or five more stores and a large school building, all of solid brick. When the writer arrived in the town the business men had practically made up their minds to rebuild of lumber and cover with galvanized iron. But the writer proved to them that brick was cheaper, although lumber cost 50 per cent. less than now and brick cost $9.10 per M at the building. The insurance before the fire was from 5 to 7 per cent. ,and after the fire it was a fraction of a cent on buildings and stock. Supposing a merchant had a building worth $4000 and a stock costing $10,000 and had it insured; he would save at least from $600 to $700 a year on insurance. Besides this, he would carry part of the risk when he has a fireproof building and at the same time be relieved of the worry incident to doing business in a fire trap.

There have been some just complaints about brick buildings as to their not being dry or warm. Now if a brick mason knows his business there is no reason why a brick building should not be as dry and warmer than a frame one. If a brick wall is laid up with a 2 or 3 in. air space so that this air space runs from top to bottom without any obstruction; if this wall is tied together with wire instead of brick, and is plastered air tight from top to bottom so that it forms a dead air space, so the air cannot leak out or circulate, and if the brickwork is well laid, the building will be as dry and warmer in winter and cooler in summer than any frame building.

Of recent years the brick manufacturers have made rapid strides toward making perfect ware for the construction of dry and warm buildings. A great improvement over the solid brick is the using of hollow brick and block in walls of residences and smaller buildings. Where hollow block are used the 4-in. outside facing should be of solid brick, which should be back plastered before the block backing is laid up against the outside facing. If a 2-in. air space can be left between the outside facing and the 8-in. block backing, both sides of this air space should be back plastered; but ordinarily a 12-in. wall without air space will do when block are used for lining, but the air space is a great improvement even when hollow block are used. In order to get the best results with hollow brick or block they should be very porous, with 20 to 25 per cent. voids. A porous block is a non-conductor of heat and cold, whereas a dense block, like iron or granite, being a good conductor of heat and cold, will make a cold and damp building. A dense block will also crack like crockery in contact with fire and water, whereas a porous block will not.

If you want a warm, dry and fireproof wall, use hard brick for the outside tier and porous blocks for the inside lining. If an air space is built, tie the walls with wire ties and not with brick. Be sure to have all the joints well filled. If this is followed a warm and dry wall is certain.

The writer has served his apprenticeship as a bricklayer and has built buildings exclusively from his fourteenth year until he was 45 years of age, and during all that time not a single building built by him has failed to keep dry. Three or four years ago he visited Canada and found that in Toronto, Montreal and Quebec three-fourths of the residences for all classes of people are of brick, and in some of the districts all of the farmhouses are of brick. Two years ago he visited in Cuba and failed to see any frame buildings in Havana.

The price of lumber has so steadily increased that thoughtful people have looked around for a substitute, and the consequence is that various kinds of building material have been put upon the market. There are blocks made of different kinds of materials with 2 to 2½ in. walls, and the rest is air space. If you wish that kind of a wall, why not buy the cheapest kind of brick? Lay up two 4-in. walls with a 4-in. air space and back plaster them, and tie them together with wire wall-ties. This gives you a very warm wall 12 in. thick and stronger and cheaper than a cement block wall. If you want cement finish, then you can plaster the outside of the wall with a thin coat of cement and quarter it off so it looks like sandstone. This cement mortar can be made rich and applied in a plastic state, which will make your wall perfectly water tight; whereas the material for cement blocks must be rammed into the forms in a semi-dry state whereby it becomes like a sponge. It will not crystallize and harden like the top coat of a cement sidewalk, which for the above reason is applied in a very soft state.

There is no doubt that it was a blessing to the bricklayers that other fireproof material was invented. This effort has had the effect of waking up the manufacturers of brick to the signs of the times. How could they expect to burn good brick in an open kiln with a 4-in. wall placed around the green bricks, and plastered with mud? Naturally with such primitive methods of burning some of the bricks were overburned, some not burned enough, some just right and some not at all. But all of them found the way to the market, and as many of the bricklayers have only "picked up" the trade, and know not an unburned brick from a burnt one, the result was that many of the half burned brick were used for outside facing and have disintegrated in the walls. But the brickmakers have opened their eyes and the progressive ones have built up to date kilns, so that all their ware is well burned. Well burned brick will last almost indefinitely in any climate and will harden with age.

History shows that clay brick is the most durable of all building material. Tablets which were made of burned clay thousands of years ago are excavated daily in all climates, and are found to be in a good state of preservation. Can this be said of any other building material?

Glass Lined Cement Tanks.

In a report recently made by Consul Alfred K. Moe of Bordeaux, France, reference is made somewhat at length to the French utilization of cement tanks lined with glass. Some years ago cement tanks began to take the place of wooden tanks in a number of the larger wine storage houses, one of the reasons apparently being the cheaper cost of material for cement tanks, as the price for timber had been gradually rising, and even at the higher prices was somewhat difficult to obtain. One of the objections, however, to the cement tanks was that in the storage of wines the acids in the liquid very often decomposed the cement, while the walls in turn absorbed the freshness of the wine. While therefore the wooden tanks were more expensive their value was greater, as they preserved the wine in a proper condition. The idea of coating the walls of the tanks with squares of glass tile joined with cement is said to have solved the difficulty, as a tartar forms on the thin surface of cement and resists all acid attacks.

As constructed in France, glass lined cement tanks may be used for all kinds of liquids except those containing a large percentage of acids, the latter leading to the decomposition of the cement joints and the loosening of the glass plates. These tanks are particularly useful as storage receptacles for wines, alcohols, brandies, liquors, ciders, oils, gasoline, kerosene, turpentine, &c. It is said that tanks so constructed are neither affected by humidity nor by infiltrations, that they resist fire and inundation, and have a further advantage in that they are not liable to be struck by lightning as are tanks of metallic material. Variations of temperature effect a minimum loss by evaporation, the degree being reported at less than 1 per cent. At equivalent temperature wooden tanks lose between 6 and 7 per cent.

These tanks are made in all sizes ranging from 20 to 2500 hectoliters (528 to 66,042 gal.) or more in capacity. The walls of the larger tank constructions are generally reinforced with iron armature.

These glass-lined tanks, constructed of concrete, are brought to the attention of the wine growers of California especially, and to American producers of cotton seed and other oils, as being valuable for storage purposes under the trying conditions of the climate, their cheapness of construction, their economy of space and their cleanliness.

THERE is a great popular demand for sheet metal fronts in the new towns of the Golden West. One firm at Evansville, Ind., which makes a specialty of such things, has work erected in every State in the West and publishes an extensive catalogue about it. This firm has gone far toward showing people that metal fronts are by no means the commonplace and tawdry affairs they were once thought to be. Many of these Western buildings are finished in novel and original ways; with individuality, as it were. There is a constant upward movement in all lines of decorative sheet metal in the West with which it is difficult for the designers to keep pace.

A NEW FIREPROOF FLOOR CONSTRUCTION.

ONE of the problems with which builders of long span reinforced concrete floor construction are being confronted at the present day is to secure increased strength without adding to the weight or cost of the floor, while at the same time obtaining the requisite depth. The use of ordinary tile has been tried with slabs reinforced in two directions at right angles to each other, but in such cases some of the concrete naturally flows into the open ends which must be kept more or less separated in order to allow for the transverse reinforcing material, and the weight of the floor is, therefore, increased without gaining anything in strength. Various attempts have been made to use hollow tile by closing the channels with pasteboard, but without altogether satisfactory results.

In the erection of the Lafayette Street School Building recently completed in the city of Newark, N. J., a system of floor construction was introduced, which has given entirely satisfactory results, and which seems to overcome the difficulty above mentioned. The system is a combination of reinforced concrete and hollow tile so designed as to combine the advantages of both materials. The system involves the use of square tile, as shown in Fig. 1 of the engravings, each tile being composed of four pieces cut wedge shaped by a special machine made for the purpose. When these pieces are assembled the result is a block closed all around in such a way as to prevent the concrete from flowing into the cellular spaces and measuring 12 x 12 x 7 in. in size. The blocks are made of any required shape and depth, and are provided at their base around the outside with flanges clearly shown in the picture, which tend to keep the bodies of the blocks properly spaced and allow room for the reinforcing rods. A feature in connection with this system of floor construction, as exemplified in the Newark school building, is that no "forms" are required, but simply a platform or "centering" supported from below at the proper floor hight on which the blocks are assembled; the reinforcing rods put in position, and the concrete poured on top and finished in the usual manner.

In Fig. 2 is shown a plan of a floor slab consisting of four of these blocks with reinforcing rods in position as represented by the heavy black lines, while Fig. 3 is a cross section through a portion of a floor constructed by this system taken on the line A B of Fig. 2, and indicating the connections with beams and girders. The heavy black dots just above the flanges between the blocks represent cross sections of the reinforcing rods embedded in the concrete, while the dotted line indicates the reinforcing material running at right angles to them. After the concrete is set and the centering upon which the blocks were placed in position has been removed, the surface of the ceiling below presents the appearance shown in Fig 4, being in shape for applying the plaster directly to the blocks without the necessity of furring.

In the school building in question the columns were so placed as to give a slab 25 x 21 ft. in area and a load test was made, as required by the Board of Education. This, however, was not a severe one, being 7000 lb. on the area mentioned and with the floor 28 days old. The slab was 8 in. deep, made up of blocks 6 in. high, with 2 in. of concrete on top. There was not the slightest deflection manifested, and the contractors being pressed for time the tests were discontinued at that point. During the course of construction, however, about 15 tons of structural material were placed on one of the slabs of 25 x 21 ft. clear span without deflecting it in the slightest degree, and this, too, with the slab only 10 days old. All the centers had been removed from five to seven days after the slabs were laid, this being made possible by the high temperature prevailing. In consideration of these facts the Board of Education declared itself entirely satisfied and accepted the construction. In fact they were so well satisfied that they have adopted the same system of floor construction in the East Side Manual Training High School, now in course of erection in Newark, and in which the clear spans are 23 x 29 ft. The saving effected not only in the cost of labor, but in materials is appreciable, and the depth of floor for the spans named being only 8 in. results in a decided gain in head room, as compared with the ordinary construction.

The construction was designed by Ferdinand Burchartz, architectural engineer, New York City, who states that the work in the school building referred to was executed 15 per cent. cheaper than the lowest bid on other systems. The construction was carried out by V. J. Hedden & Sons Company, with offices in the Metropolitan Tower, New York City.

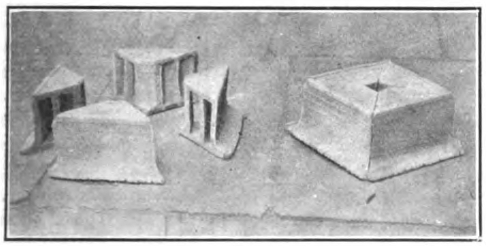


Fig. 1.—View of a Block or Tile and Its Component Parts.

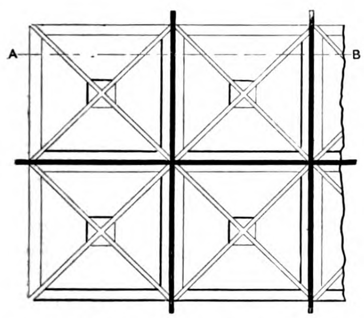


Fig. 2.—Plan of a Floor Slab, the Heavy Black Lines Indicating the Reinforcing Rods Running at Right Angles to Each Other.

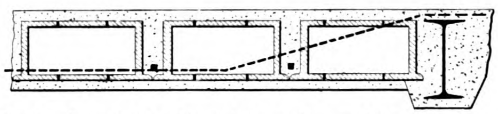


Fig. 3.—Cross Section Through Floor Slab on Line A-B of the Plan, Fig. 2.

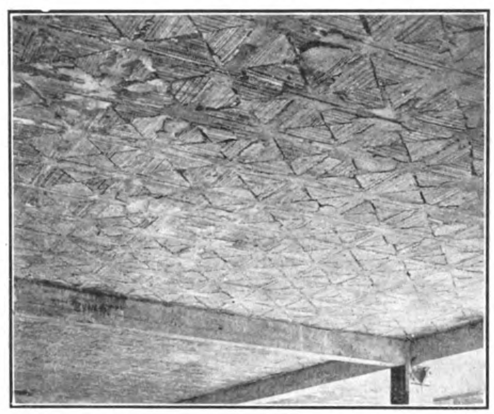


Fig. 4.—Appearance of Ceiling After Floor Is Laid and "Centering" Removed.

A New Fireproof Floor Construction.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

CHARLES T. ROOT, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - VICE-PRESIDENT
W. H. TAYLOR, - - - SECRETARY AND TREASURER

Entered at the New York Post Office, as Second Class Mail Matter.

DECEMBER, 1909.

Bookkeeping Methods for the Builder.

While the ability to make an accurate estimate of the cost of doing work is of the greatest importance to the contracting builder by reason of its bearing upon the success or failure to secure a profit in connection with the contracts which may be awarded him, yet not a little of his pecuniary reward will be found to depend upon the office methods or system of bookkeeping, so to speak, which he employs in keeping track of the cost of jobs and other data pertaining thereto, so as to be readily accessible whenever occasion may require reference to them. Each builder doubtless makes use of the scheme which seems best suited to his own needs, but the successful man must perforce have some general system which will enable him to find what is wanted in the shortest possible time and with a minimum expenditure of labor. Naturally these methods will vary with the particular line of building in which the contractor may be engaged and what may answer in one case may not in all respects meet the conditions existing in another. There will, however, be found points which are common to both that can be utilized, and possibly with slight modifications the entire system which one contracting builder has used with success may be adopted by another. Bearing upon this phase of the building business is the communication in another column from a well known correspondent who has had a wide and varied experience as a successful contractor. He describes the system of bookkeeping employed in the business with which he is connected in such a way as to hold the close attention of the reader, his communication affording as it does suggestions of interest and value to those who may be seeking information on a phase of the building business which is not considered to any appreciable extent in any of the current literature relating to construction work. The subject offers an excellent field for discussion, and we take this occasion to express the hope that contracting builders all over the country will feel it incumbent upon themselves to set forth in writing the system of bookkeeping which they employ in connection with their business for the purpose of keeping track of cost data and other information to which they have occasion to frequently refer.

Commercial Buildings in Residential Sections.

The efforts which have been made in various residential sections of the metropolis to prevent the invasion of trade have recently resulted in a successful outcome in one instance at least through the purchase of the invading building after work had actually been commenced upon its erection. The bitter struggle made by the Vanderbilts to prevent the encroachment of trade upon the residential neighborhood of upper Fifth Avenue without altogether satisfactory results is now being duplicated in what is known as the Murray Hill section, where for some time past property owners have been fighting to halt the northward migration of business along Madison avenue at Thirty-fourth street. Some days ago the property owners gained an important point through the purchase by a prominent banker of the northwest corner of Madison avenue and Thirty-eighth street, on which the steel work of a proposed 20-story office building was rising and which, if completed, would have been the first structure of its kind to invade the Murray Hill colony. The site it occupied immediately adjoins the residence of another prominent banker of the city and overlooks the extensive holdings of others in the immediate vicinity. The corner in question has a most interesting history. Three years ago there stood upon its site the old Allston Apartment House, which in 1906 was purchased by a realty company who held it for a few months and then turned it over to a subsidiary concern. Two years later the corner was transferred to a company controlled by a well-known builder and real estate operator, who announced that he intended to tear down the Allston and erect on the site a 12-story apartment house. The neighbors objected and threatened to appeal to the courts for the enforcement of the old Murray Hill restriction, which provided that no building other than a private residence could be erected on Madison Avenue, between Thirty-fourth and Forty-second streets. The operator assured them that the apartment house he proposed to erect would be of a high class type, and would be quite unobjectionable. Thereupon the opposition ceased. Nothing more was heard of the apartment house project, however, until July, 1909, when notice was given by the operator that he had abandoned the plan of building an apartment house, and instead would erect a 20-story business structure. The result of this was that the residents of the Murray Hill section rose en masse to register their protest. The steel work was under way when George F. Baker, Jr., vice-president of the First National Bank, went to the operator and asked him to name his figure for the property. It was a very substantial one, and is reported to have been not much short of $1,000,000. The purchase was completed, and now Mr. Baker announces that two private residences will be built where the 20-story office building was intended to rise. It may be interesting to remark as a commentary upon the enhancement of real estate values in New York City that four months previously the same corner was sold for half the sum named above, although in this instance the circumstances, it is true, were somewhat unusual.

New York's Latest Office and Theater Building.

Another important improvement in what will doubtless soon be the very heart of the theater district is the handsome 12-story structure about to be erected on the southeast corner of Broadway and Forty-third street, a site which for a long time past has been occupied by one and two story buildings known as taxpayers, and which has not been improved because of the fact that the owner was a nonresident unwilling to sell and indisposed to improve with buildings consistent with the demands of the neighborhood. The plot is an unusually valuable one, having a frontage of 104½ ft. in Broadway and 103 ft. in Forty-third street. The plans which have been prepared by Architect George Keister show an attractive structure, which will be used as a theater and office building, the design of the exterior being a dignified classic renaissance in white. The Broadway side has three stories of base and subbasement of white granite and limestone, above which will be semiglazed tool faced white terra cotta, with a frieze and main cornice finished with three stories of a full order, and topped with a balustrade of classic design. The theater front in Forty-third street will be in the same materials as the Broadway façade, crowned with a classic cornice and balustrade for the main building and a classic pediment masking in the elevation of the stage above the main auditorium. The main entrance to both theater and office building will be from Broadway, with a spacious vestibule to both and a separate lobby for each. A feature of the building will be the unique style in which the vestibule and lobbies are to be finished in rare marbles and classic murals. The theater is to be complete in every respect as a first-class house and devoted to high class productions. The entire work is to be carried out with special care to the safety as well as to the convenience of the patrons. The stage will be equipped with every scenic, electric and mechanical device for the production of plays. The café in the first story will be another special feature, and will be finished as the only real French café in the city. Besides being a café it will form a part of the ground entrance to the Rathskeller in the basement, which can also be entered from the Subway station. The rest of the first and second floors on the Broadway side will be given up to high class store premises. The cost is estimated at a trifle over $1,000,000.

Contractors Required to Accompany Bids with Certified Check.

In discussing editorially a custom that seems to be coming more and more into favor in the architectural profession whereby it is made increasingly difficult for financially irresponsible contractors to secure opportunities of submitting estimates for work, a recent issue of the *American Architect* says: It is now a common practice to require all bidders upon important work to deposit a certified check to cover the cost of blueprints and specifications, as a guarantee of the bidder's intention to present a *bona fide* bid, and also to insure the return of drawings and specifications to the architect. In stipulations such as these, regarding the use of plans and specifications, there is usually no actual expense forced upon the contractor for the privilege of bidding; his deposit is merely a guarantee of good faith and a preventive of the waste of prints and specifications. In some offices, however, the actual cost of these is defrayed by the contractors, for whose sole use they have been made. In any case it would seem that the day is past when a contractor could ask for and receive, at the architect's expense, a set of drawings and specifications to bid upon and neglect to return, or to glance over and throw away, as he saw fit.

Another step along the same line is to require each bidder to deposit with his proposal a certified check covering, say, 5 or 10 per cent. of the contract price, as a guarantee that he will furnish bond as required by the specification, insuring proper execution of the work if awarded the contract. The amount of this temporary security should, of course, be determined by the size of the contract and by local conditions. It would be a mistake, obviously, to make the amount so high as to exclude from competition the man who could undoubtedly carry through the work, but who might be embarrassed by the necessity for tying up even temporarily a large part of his working capital. To illustrate how a safeguard may be turned into a serious hardship upon the community, the security required to be deposited as a qualification for bidding in the case of Government work in some countries is a large per cent. of the approximate contract price, and this sum is retained until completion of contract. It is apparent that in a very large piece of work there might be but one bidder who could post the required sum as a guarantee. To offset this the law ordinarily requires more than one qualified bid as a condition to awarding the contract. It will readily be seen, however, that a wealthy bidder could get around this and secure the work at his own price by the simple expedient of making the necessary financial arrangements, and having a dummy bid submitted at a higher figure than his own.

An Interesting Example of Artistic Brickwork.

The student of building construction who appreciates the artistic effects which may be produced in brickwork and masonry cannot fail to be impressed with the façade of the new building completed a short time ago for the Lotos Club in West Fifty-seventh street, New York City. It is a six-story structure having in its front elevation 16 different kinds of brick, the entire scheme being worked out in such a way that no cutting or grinding of the brick was necessary. The brick joints of the wall surface were variously treated, in some portions being raked out and in other portions being flush.

The first story is of limestone treated with arched door and window openings and with a stone balcony extending across the building at the second story. Above the balcony the façade is built up of very rough "tapestry" brick; that is, brick 12½ in. long by 4 in. deep and 2⅝ in thick. The surface is rough and varies in color from a creamish white to a light brown, the general color effect giving to the eye the appearance of light tan. At the sixth floor there is a balcony of wrought iron, the face of the wall above being pierced by three arched window openings. The impost courses of the arches consist of brownish red brick laid in a chainwork pattern while the field above the arches is made up of headers in which a lotos flower alternates with the brownish gray of the field and with single and double crosses in darker reddish color.

In the façade embracing the four stories between the two balconies referred to the mortar is made of a coarse gravel Portland cement and a small quantity of lime, giving a warm gray tone. The headers forming the diagonal lines throughout the main façade measure 4 by 2⅝ in., and are of cream white, standing out in a brownish gray field with considerable distinctness without making too great a contrast.

At the intersection of the white lines thus formed is a Greek cross, made by four square bricks and a yellow tile in the center, each square brick of the brownish background having a white lotos flower cast upon it in low relief. The brick pattern work panels forming a frieze underneath the sixth floor balcony have a color combination of brownish gray, straw colored cream and white brick.

Officers New York Lumber Trade Association.

At the twenty-third annual meeting of the New York Lumber Trade Association, held at its headquarters, 18 Broadway, Borough of Manhattan, New York, the following officers were elected for the ensuing year.

President, Russell J. Perrine, Brooklyn.

First Vice-President, John F. Steeves, Borough of Manhattan.

Second Vice-President, Frederick W. Starr, Brooklyn.

Treasurer, Charles F. Fischer, Manhattan.

A very interesting address was made by retiring President James S. Davis of Brooklyn, who had held the office for five years. The report of the Board of Trustees showed a total membership of 230, while the report of the treasurer indicated an excellent financial condition.

Meeting of Minnesota State Association of Builders' Exchanges.

The annual meeting of the Minnesota State Association of Builders' Exchanges will be held in the rooms of the Builders' Exchange, 17 Sixth street, South, Minneapolis, Minn., on Wednesday, December 8, beginning at 10 o'clock in the forenoon.

THE JOBBING CARPENTER AND SOME OF HIS WORK.*—X.

By EDWARD H. CRUSSELL.

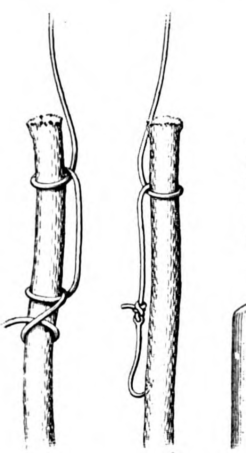
AFTER having made all necessary repairs to the doors of the building as described in the last issue of the paper, the next thing will be to examine the windows. One of the chief repairs to these is the replacing of a broken sash cord. To the mechanic of experience this is a simple job, but to the novice it is likely to present no little difficulty. Replacing a broken cord is sometimes more of a job than hanging new sash, although any person who has done one will not find any difficulty in doing the other. The cords of the outside sash are the hardest to replace because of the inside sash being in the way. If the sashes are large and heavy it is usually better to take the weights off the inner sash and remove it entirely out of the way. Indeed, in most cases this is the proper thing to do, because all of the cords of the window will be more or less worn and the difference in cost between replacing a cord in the outer sash and the replacing of all four cords is hardly anything more than the price of a few feet of sash cord.

In the experience of the writer, he has found men who called themselves carpenters and yet who did not know for what purpose the pocket was cut in the pulley stiles of the window frames. They had been in the habit of putting in the weights and cords before the window boxes were covered up, and when set to work to hang some sash for which the weights had not arrived until the job was completed they commenced to tear off the casings in order to get at the weight boxes. This seems hardly credible, but it is a fact, nevertheless.

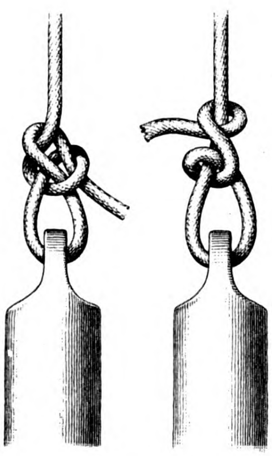
When the window frames are so made that the inside casing forms one side of the weight box, it is much easier and quicker in new work to put in the weights and cords before the casings are fixed. In repair work the casings are already on, and it then becomes necessary to hang the sash by passing the weights through the pockets provided for that purpose. The first thing we must do is to take off the inside stops and take out the parting bead so as to get at them. Very often the beads and stops are stuck fast with paint and require great care in their removal. A few sharp taps with a hammer and block of wood will often break the joint formed by the paint, the block of wood being, of course, used under the hammer to prevent it marring the woodwork. With the beads, stops and pocket piece removed we can now reach into the weight box and remove the weight. Fig. 60 represents a view of the pulley stile as it now appears, "A" being the pocket piece.

For passing the cords over the pulleys and down inside the weight box a small homemade affair called a "mouse" and shown in Fig. 61 is used. It is simply a curved strip of lead about 3 in. long and ⅜ in. wide to which is attached a piece of twine or string long enough to reach from the top to the bottom of the window. The free end of the string is fastened to the end of the sash cord and the "mouse" is passed over the pulley and allowed to fall inside the box. It is then brought out through the pocket and the sash cord drawn after it. The weight is now fastened to the cord and replaced inside the box, after which it is drawn up until it will go no further, when the cord is cut to the proper length, which will be just so as to allow of the sash resting on the window sill after the cord is fastened to it. With the sash in this position there should not be more than an inch or at most 2 in. of slack in the sash cord. To have more than this is considered poor workmanship.

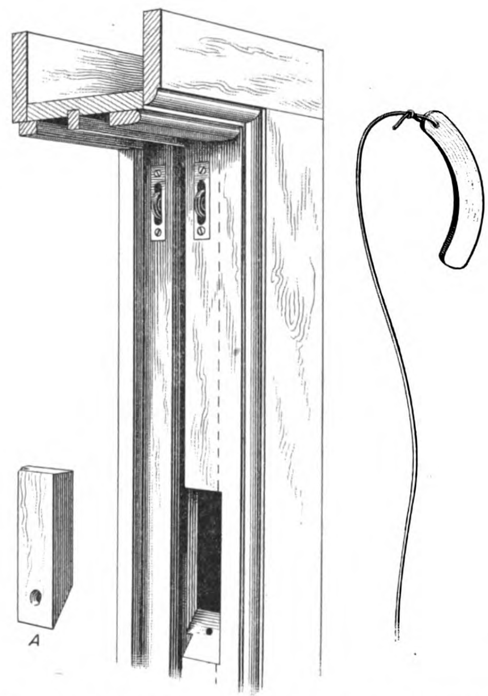
When all four cords are to be replaced the best practice is to thread all the pulleys before removing the "mouse" from the sash cord, which saves a little time in the tying and untying, and is generally considered more workmanlike. When using this method thread the outside pulleys first, and then the inside ones, taking the cord across the window each time, otherwise the workman is likely to get tangled and waste a lot more time than he would expect to save. With the pulleys all threaded tie a weight to the end of the cord, pull it up tight, measure and cut off. Tie a knot in the end



Figs. 62 and 63.—Methods of Attaching "Mouse" to Cord.



Figs. 64 and 65.—Knots for Fastening Cord to Sash Weights.



Figs. 60 and 61.—Views of Pulley Stile of Window Frame and "Mouse" for Passing Cord Over the Pulleys.

The Jobbing Carpenter and Some of His Work.—X.

* The author of these articles will be glad to discuss any phase of work in the line of jobbing carpentry that the reader may suggest.—EDITOR *Carpentry and Building.*

of this cord to prevent the weight taking it back into the box again and then go on with the others. A better scheme than tying a knot in the cord is to pull the weight up where it belongs and drive a 3-d. nail through the cord into the pulley stile. This holds the weight in its place and leaves the workman with both hands free when he goes to fasten the other end of the cord to the sash. The cord should be fastened before it is cut to length, then if the weights are heavy they can be held in place by standing on the cord, which again leaves the workman with both hands free for the hammer and nail.

Braided sash cord being hard and smooth it is sometimes rather difficult to make the string fast to it. In Fig. 62 is shown one method of doing this. The string is fastened with a clove hitch a couple of inches from the end of the cord and then a half hitch is put on close to the end to make it lead straight. In Fig. 63 is shown a better and quicker method. In it the end of the string is supplied with a small hook which is pressed into the sash cord, then a half hitch placed as shown makes everything secure.

This latter method is original with the writer so far as he knows, and was hit upon quite by accident. While hunting one day for a piece of twine with which to make a "mouse" a small fish line was unearthed. He was

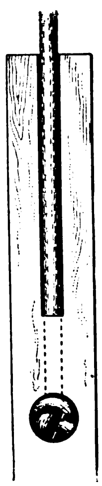


Fig. 66.—One Method of Fastening Cord to the Sash.

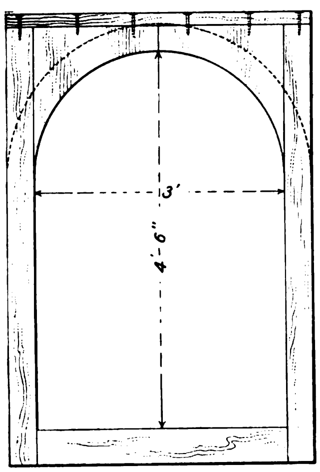


Fig. 67.—Ticket Window to Be Repaired.

The Jobbing Carpenter and Some of His Work.

about to discard the hook from the end of the line when it suddenly occurred to him that the hook was the very thing needed. It was necessary to file the barb from the hook so as to make it easy of removal, and then all the old trouble of the twine or string slipping off the cord was forever ended.

There are different ways of fastening the cord to the sash weights, some people preferring the bowline knot shown in Fig. 64, while others like a knot that can be slipped down close to the weight after it is tied. For these the knot composed of two half hitches, as shown in Fig. 65, is everything desirable.

For fastening the cord to the sash when the latter are properly bored for the purpose a simple overhand or round knot will suffice. The writer, however, has been in the habit of making things doubly sure by driving a small nail in the end of the cord after the knot is tied and in its place. This is quite clearly indicated in Fig. 66. In those cases where the sash are simply grooved and it is necessary to fasten the cord entirely with nails care must be observed to keep the nails far enough down so that they will not interfere with the pulleys.

Sash weights are obtained in sizes from 3 to 9 lb., varying by ½ lb. and from 9 to 26 lb. varying by pounds. Half pound weights can also be had, the latter being merely cylindrical pieces of cast iron about 2 in. in diameter and ¾ in. high, with a hole through them vertically for the passage of the sash cord. They are useful for making an exact balance, or in cases of low heavy windows in which there is not sufficient room to cut the pockets high enough to take in the weights. Two inches in diameter is about as large as a sash weight can be made and all extra weight must be added lengthwise. This makes a 24-lb. weight about the length of a walking stick and the thing to do where weights as heavy as this are needed is to get a weight as large as the pocket will take and make up the balance with the ½ lb. weights, which may if necessary be placed in the weight box one at a time. Sometimes for cases like the foregoing instead of the ordinary cylindrical cast iron weights, lead weights of a square section are used, but their cost prohibits their general adoption.

If it ever becomes necessary to use up some weights that are too heavy for the purpose do not make the mistake of trying to cut them with hammer and cold chisel. It is easy to break them wherever required by striking them over the corner of some heavy article, such as a blacksmith's anvil. In the absence of anything better they are often broken by striking one weight over another. Great care is required in breaking weights that are more than 18 or 20 in. long, as these are liable to break in three pieces, about as much snapping off behind where the weight is held in the hand as breaks off in front.

Window frames are sometimes made which allow of both sashes running clear up into the head, thus leaving the entire window space open. They are used in place of a door or French casements, and generally form a mode of egress on to an upper balcony. It is, of course, necessary to make these frames half as high again as an ordinary window, but as the upper portion is hidden in the wall and inaccessible once the frame is set and the building plastered, the pulleys in these frames should be located at the point where the sashes run up into the window head.

The writer once had to replace some cords in a window of the above description, and found that the genius who constructed it had put the pulleys close up to the top head of the frame which made them about 3 ft. out of reach. He at first considered the advisability of putting in new pulleys at their proper places, but finally managed to pass the "mouse" over those already in by the help of a short stick to which was attached a piece of lighted taper. The "mouse" was balanced on the end of the stick, and at the first trial the light burned the string off it. This merely made necessary the readjustment of the apparatus, after which all four pulleys were threaded without a hitch. It is hardly necessary to mention that the light is needed to enable one to see what he is doing.

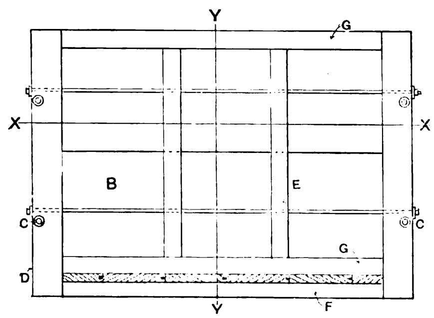
Some time after this little problem had been solved it became necessary to make repairs to a ticket window in a public building. The window had only one sash, which was 3 ft. wide and 4 ft. 6 in. high. It had a semicircular head and was glazed with plate glass. Like the other one, it ran up into the wall, and nobody at the time of its construction had thought of making provision for any repairs to it. Remembering the success with the former job, this one was commenced with all confidence. The confidence, however, did not last long, for it was soon found that although the sash was made to show semicircular outside, inside in the wall it was rectangular, being, in fact, made as shown in Fig. 67, which, of course, would prevent its being taken out of its frame. The strip shown across the top of the sash was fixed to it with glue and a few nails. This was discovered by the writer soon after he commenced to cut the sash around on the dotted line with his compass saw. After the sash was finally removed the trouble was found to be a broken pulley. So as the window was only required to open as far as the springing of the circle, two new pulleys were inserted as high up on the frame as it was possible to reach, and then the sides of the sash were replowed and the cords fastened to it at the bottom. It was then necessary to use square lead weights the full size of the weight box in order to get drop enough.

CORRESPONDENCE.

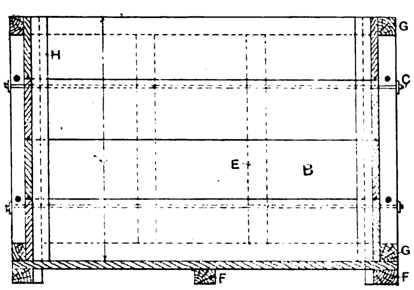
Design for a Water Tank.

From Paul T. Lesher, Steelton, Pa.—In the September issue of the paper "A. G. W.," Seattle, Wash., asked for a design for a water tank of 800 gal. capacity, and in reply thereto I submit the accompanying sketches with brief data. It may be well to state that the same letters refer to the same parts in the different drawings. The members A and B, which are the bottom and sides of the tank, are 1½-in. tongued and grooved boards. The members marked D are 6 x 6 in. timbers, notched as shown. The members marked E are 3 x 3 in. timbers, which are used to brace the sides. Members G are also 3 x 3 in. timbers, while those marked F are 3 x 4 in.

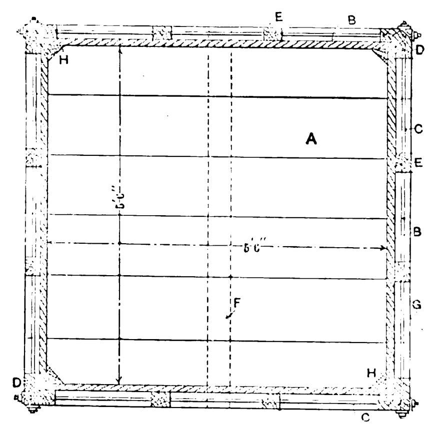
In order to resist the pressure of the water upon the sides of the tank wrought iron rods, C, C, C and ¾ in. in diameter, are used, the ends being provided with washers so the nuts will not cut into the wood. The triangular cleats H H are used to make a water tight joint at the corners.



Elevation of Framing as Viewed from the Outside.



Vertical Cross Section on Line Y-Y of the Elevation.



Horizontal Cross Section on Line X-X of the Elevation.

Design for a Water Tank.—Contributed by Paul T. Lesher.

Criticism of Roof Plans for Dwelling.

From A. H. J. C., Kennebunkport, Maine.—In the August issue there appeared a communication, with roof plan, from "H. J. K.," Denver, Colo., wherein he does not agree with "R. H. C.," San Antonio, Texas, whose plan appeared in the June issue, in reply to the request of "G. W. G." in the May number, regarding the claim that there is a valley at the point "A" of the plan in the August issue. Now, in my opinion, there certainly is a level valley on this roof plan, and that is the straight legitimate way for the two roofs to come together. As a level valley, however, is a very hard thing to render tight, I should approve of "H. J. K.'s" method of getting over it—that is, bridge the valley with what is called a "cricket."

Details of a Louver Ventilator.

From M. S. M., Washington, D. C.—We wish to offer a few suggestions as improvements in the ventilator illustrated in your issue for October, page 361, and contributed by Henry Hall. There seems to be much unnecessary work in its construction, and for the benefit of novices we wish to point out these features.

To begin, there need be no wood at all used in its construction. By using No. 24 gauge material and riveting the top and bottom joints it will have strength enough for any use. Then the louvers or slats are too much overlapped, the lower edge of the one ought to be level with the top of the other; also the two extreme edges turned on slats makes too much obstruction for outgoing air and should be omitted. The gutter also has one-fourth too much projection. The tie rods should also be solid in one piece, round in shape, flattened at the ends to receive the rivets. The adjustable buckle in the tie rod is of no use, but is a weakness in the vent of a lateral wind pressure on the ventilator. Finally, the ventilator should be built on the outer edge of the wall, thus avoiding a level water table.

What Is the Instrument and for What Is It Used?

From R. W. McDowell, Uniontown, Pa.—In reply to the query of "S. B.," Rome, N. Y., in the November number, I would say that the instrument he described was advertised quite extensively two or three years ago under the name the "Universal Drafting Instrument" or something similar. I am not sure whether this was the exact title or not. At the time claims were made that the instrument would take the place of a T-square, compasses, protractor and other drawing instruments.

An Eastern Builder Describes the Beauties of the West.

From Hee. H. See, Sacramento, Cal.—I have noted the last paragraph of the letter from L. H. Hand of Chicago, Ill., on page 386 of the November issue of *Carpentry and Building* and I reach out my hand to him (no pun intended). Mr. Hand quotes, "We fought in the same campaign together." According to my notion, "fought" is exactly the correct word, especially when mentioned in the same breath with beds and boarding houses. I know nearly all about it, for I have railroaded now for 15 years, and it would be interesting to me to know how Mr. Hand broke himself of the habit after 13 years of it.

I tried to do this two years and a half ago when I came West, but couldn't manage it. However, things are getting better for all of us all the time; we have our own beds and boarding cars, and the food is all that could be wished. The mountains are the only places where we get blizzards in California, and it always helps some to know that you can go down into the valleys and get thawed out any time you feel like it.

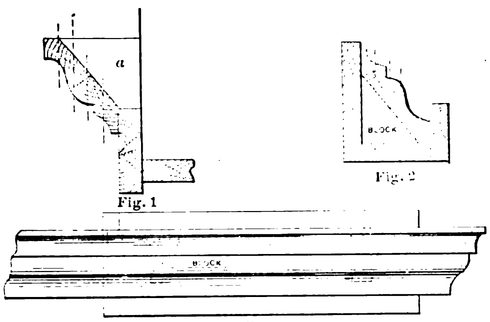
Clearing up a wreck in a blizzard is a job that has many interesting features, but a washout in the pouring rain runs it a close second, while a snow or rock slide in the mountains, taking out from 500 to 2000 ft. of snow shed and track along with it, has them both beaten the length of a street.

Oh, yes indeed, railroading has many interesting features, and any one who wouldn't sell a farm and come and join us must be surely "bughouse," as they say in polite society.

Well, so long, "Old Timer," I've got to hit the hay. Glad to hear from you at any time.

Setting Out a Splayed Crown Molding for Circular Cornice.

From L. K., Cragsmoor, N. Y.—In the November issue of *Carpentry and Building* a correspondent signing himself "W. I. H.," Monroe, N. Y., asked for a method of springing a crown molding around a circular cornice. In reply I beg to say that one way to do the work would be to rip the molding in strips of suitable thickness to bend around the required circle. The molding should be ripped vertically, as indicated by the dotted lines in Fig. 1 of the accompanying sketches. In order to hold the molding firmly while sawing, a box should be made in which to maintain the molding within proper bounds. An end view of the box is shown in Fig. 2, which represents it with the molding in place, while Fig. 3 is a top view of the box with a strip of molding placed therein, the blocks being indicated by the dotted lines.



The Three Sketches Accompanying the Letter of "L. K."

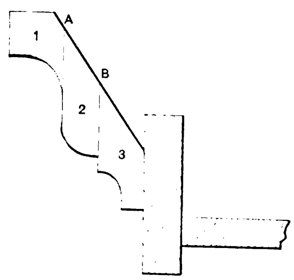
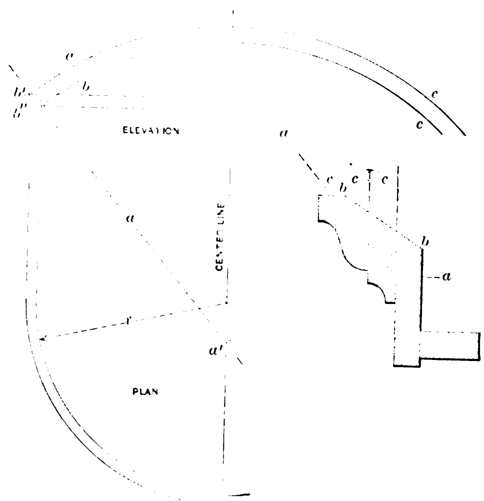


Fig. 4.—Method Suggested by "R. C. P. B."



Figs. 5 and 6.—Plan Adopted by "A Student."

Setting Out a Splayed Crown Molding for Circular Cornice.

After the strips are cut they may be bent around the cornice in their proper order and then if necessary sandpapered smooth. To make a good job of it nailing blocks should be spaced at short intervals around the cornice, the shape of the blocks being indicated by *a* in Fig. 1.

From R. C. P. B., Arcadia, Iowa.—I have received a great deal of information from time to time from the columns of *Carpentry and Building*, but have never as yet been a contributor to the Correspondence Department for the benefit of others. I have, however, just completed a job on which I had a round porch and dome on which I used the same crown molding as "W. I. H.," Monroe, N. Y., asked about in the November issue. I bent it around a curve with a 7-ft. radius by ripping the molding as shown in the sketch, Fig. 4, on the lines A and B, using for the purpose a No. 12 saw. I had no difficulty whatever in bending the three pieces separately around the cornice. This makes a much better appearing job than kerfing the whole molding, while at the same time it is more substantial.

If, however, the circle is very small I rip the molding and kerf the different pieces separately, then sandpaper and give a good coat of white lead and oil.

This is the way I have worked out the problem, but as it is an interesting one and susceptible of other solutions lets us hear from practical readers all over the country.

From a Student, Rye, N. Y.—I am inclosing sketches answering the correspondent "W. I. H.," Monroe, N. Y., regarding a method of setting out a splayed crown molding for a circular cornice. To find the curve of any splayed molding for any circle, prolong the face line, as *a* of Fig. 5, until it crosses the axis or center line, as at *a'*; then with *a'* as a center and *a' b'* and *a' b''* as radii draw the semicircular lines *b c* and *d c*, which will represent the proper curve and width of the molding.

This is for a molding when made of wood because of the cross grain of the material. A laminated molding, as shown in Fig. 6, is by far better if made of three piece, *c c c*, and as shown at *b b*, instead of following the line *a a*, as is usually the case.

Method of Soundproofing a Wall and Partition.

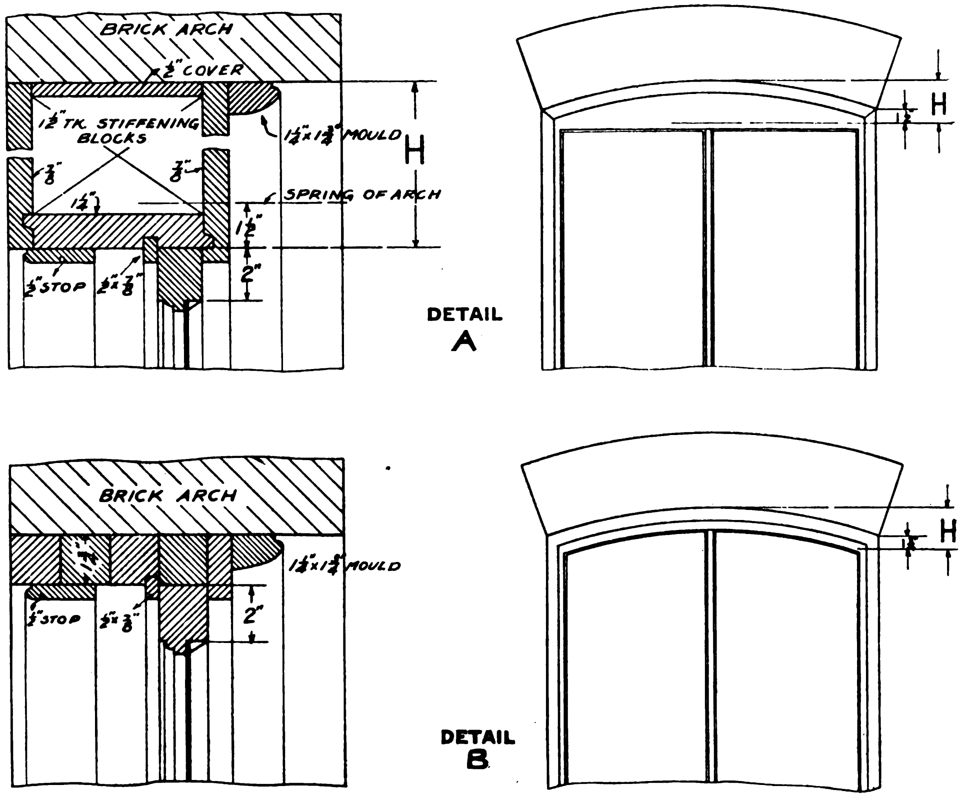
From J. H. D., Titusville, Pa.—Having been a subscriber to your publication for several years past, I write for information as to the best method of soundproofing a wall and partition. Any facts which the practical readers may furnish will be greatly appreciated.

Note.—With no desire to anticipate the comments which we hope our readers will contribute in reply to the above, we might suggest that there are several methods of accomplishing what our correspondent desires. One plan where expense is not an important consideration is to fill all spaces between studs with mineral wool, while another scheme is to attach to both sides of the wall studding layers of deadening felt or quilt, several varieties of which are on the market, and then lath and plaster in the usual way.

Figuring the Hight of the Springing for Circular Headed Window Sash.

From J. G. Dempsey, Paterson, N. J.—It is a problem for the millman every time he receives a contract for circular head window frames to figure the hight of the head from the springing to the head of the arch. In some instances the architect or draftsman specifies this on his drawing, but in most cases it is left to the millman to figure. It takes only a fraction of a minute to place this on the drawing, but the time is consumed in figuring. In all cases the millman would prefer to be able to take this hight from the drawing rather than have to figure it and then check his figures.

The radius that is used in almost every case for the circular head window frame is one and one-half times the width of the brick opening. The table presented herewith has been computed taking the standard radius as above:



Figuring the Hight of the Springing for Circular Headed Window Sash.

Table for Circular Head Window Frame with Square Head Sash.

Width of B.-O. Ft.	In.	Radius of arch. Ft.	In.	H.	Width of B.-O. Ft.	In.	Radius of arch. Ft.	In.	H.
1	0	1	6	2.53	6	7	9	10½	8.28
1	1	1	7½	2.62	6	8	10	0	8.36
1	2	1	9	2.70	6	9	10	1½	8.45
1	3	1	10½	2.79	6	10	10	3	8.54
1	4	2	0	2.87	6	11	10	4½	8.62
1	5	2	1½	2.96	7	0	10	6	8.70
1	6	2	3	3.04	7	1	10	7½	8.79
1	7	2	4½	3.13	7	2	10	9	8.88
1	8	2	6	3.22	7	3	10	10½	8.96
1	9	2	7½	3.30	7	4	11	0	9.05
1	10	2	9	3.39	7	5	11	1½	9.14
1	11	2	10½	3.47	7	6	11	3	9.21
2	0	3	0	3.56	7	7	11	4½	9.31
2	1	3	1½	3.65	7	8	11	6	9.39
2	2	3	3	3.73	7	9	11	7½	9.48
2	3	3	4½	3.82	7	10	11	9	9.56
2	4	3	6	3.90	7	11	11	10½	9.65
2	5	3	7½	3.99	8	0	12	0	9.74
2	6	3	9	4.07	8	1	12	1½	9.82
2	7	3	10½	4.15	8	2	12	3	9.90
2	8	4	0	3.25	8	3	12	4½	9.99
2	9	4	1½	4.33	8	4	12	6	10.08
2	10	4	3	4.42	8	5	12	7½	10.17
2	11	4	4½	4.50	8	6	12	9	10.25
3	0	4	6	4.59	8	7	12	10½	10.33
3	1	4	7½	4.67	8	8	13	0	10.42
3	2	4	9	4.76	8	9	13	1½	10.51
3	3	4	10½	4.85	8	10	18	3	10.59
3	4	5	0	4.93	8	11	13	4½	10.68
3	5	5	1½	5.02	9	0	13	6	10.77
3	6	5	3	5.10	9	1	13	7½	10.85
3	7	5	4½	5.19	9	2	13	9	10.94
3	8	5	6	5.26	9	3	13	10½	11.02
3	9	5	7½	5.36	9	4	14	0	11.11
3	10	5	9	5.45	9	5	14	1½	11.19
3	11	5	10½	5.53	9	6	14	3	11.28
4	0	6	0	5.62	9	7	14	4½	11.37
4	1	6	1½	5.70	9	8	14	6	11.45
4	2	6	3	5.79	9	9	14	7½	11.54
4	3	6	4½	5.88	9	10	14	9	11.62
4	4	6	6	5.96	9	11	14	10½	11.71
4	5	6	7½	6.05	10	0	15	0	11.79
4	6	6	9	6.13	10	1	15	1½	11.88
4	7	6	10½	6.22	10	2	15	3	11.97
4	8	7	0	6.30	10	3	15	4½	12.05
4	9	7	1½	6.39	10	4	15	6	12.14
4	10	7	3	6.48	10	5	15	7½	12.22
4	11	7	4½	6.56	10	6	15	9	12.31
5	0	7	6	6.65	10	7	15	10½	12.40
5	1	7	7½	6.73	10	8	16	0	12.48
5	2	7	9	6.82	10	9	16	1½	12.57
5	3	7	10½	6.91	10	10	16	3	12.65
5	4	8	0	6.99	10	11	16	4½	12.74
5	5	8	1½	7.08	11	0	16	6	12.82
5	6	8	3	7.16	11	1	16	7½	12.91
5	7	8	4½	7.25	11	2	16	9	13.00
5	8	8	6	7.33	11	3	16	10½	13.08
5	9	8	7½	7.42	11	4	17	0	13.18
5	10	8	9	7.51	11	5	17	1½	13.26
5	11	8	10½	7.60	11	6	17	3	13.35
6	0	9	0	7.67	11	7	17	4½	13.43
6	1	9	1½	7.76	11	8	17	6	13.51
6	2	9	3	7.85	11	9	17	7½	13.60
6	3	9	4½	7.94	11	10	17	9	13.68
6	4	9	6	8.02	11	11	17	10½	13.77
6	5	9	7½	8.11	12	0	18	0	13.85
6	6	9	9	8.19	12	1	18	1½	13.94
					12	2	18	3	14.02

The sketches are merely to give the reader an idea of the window frame heads as they are made and to

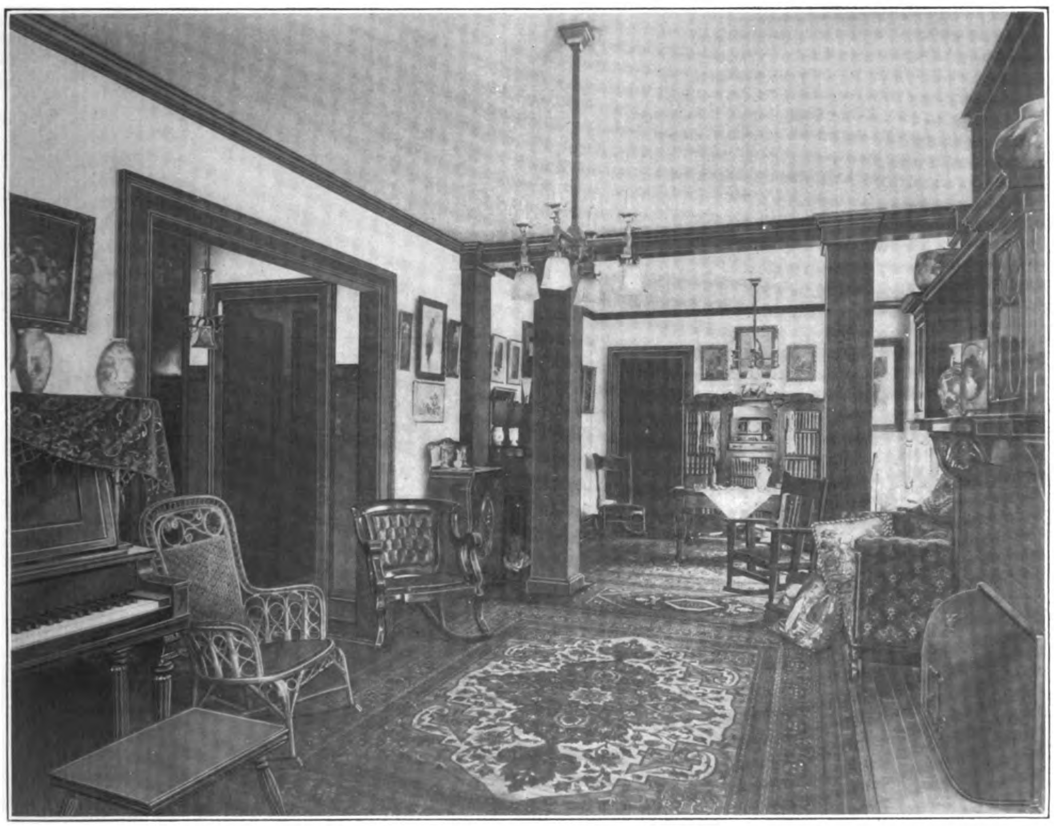
THE BRICK-TILE VENEERED RESIDENCE OF MR. U. M. DUSTMAN, AT FREEPORT, ILLINOIS

U. M. DUSTMAN, ARCHITECT

Supplement Carpentry and Building, December, 1909

View in "Den" on Second Floor, with Dressing Room at the Left and a Sleeping Room at the Right.

The Dining Room as Seen from a Point near the Door Leading to the Front Hall



View in Living Room and Library Showing General Style of Finish

A BRICK-TILE VENEERED RESIDENCE AT FREEPORT, ILLINOIS

U. M. DUSTMAN, Architect

Supplement Carpentry and Building, December, 1909

show the hight "H." These are the standard window frame heads as used by all architects and builders. The table is very important to the architect, millman, &c., as it is of use to him every day in his work.

This table has been computed for the circular head frame with the square head sash. One and one-half inches has been allowed for the bearing of the window head upon the box frame. If it is necessary for the architect or millman to make this bearing lighter or heavier, he can do so by subtracting or adding to the hight given in this table the number of inches or fractions thereof in decimals of an inch.

It is not necessary to have a table for the circular head sash, as the table illustrated herewith will answer this purpose. The thickness of the circular head frame in almost every case is 1¾ in., and therefore, as 1½ in. has been allowed in the table, it will only be necessary to add ¼ in. in decimals and the required hight H can be obtained. If it should be necessary to make the thickness of the window head frame lighter or heavier, the number of inches or fractions thereof can be added or subtracted to find the hight H. Care should be taken in figuring this that 1½ in. has already been allowed.

Bookkeeping for the Builder.

From C. M. C., New York City.—Can any of the readers of the paper give me points on the bookkeeping end of the building alteration and repair business? I feel sure there are many who would be benefited by a discussion of the subject, especially those who wish to improve their office methods so that the cost of jobs and records of them can be ascertained and kept with the least possible amount of labor.

I am doing a general alteration and repair business and would greatly appreciate any suggestions which would improve my systems. It is a most remarkable thing, but in New York City I can find no book which treats on this subject, and in my opinion a book which is not written for this special business is of no value and does one more harm than good. Do any of the readers know of such a book?

From Arthur W. Joslin, Boston, Mass.—I do not know as the bookkeeping methods which I am about to outline are at all new or that the correspondent in question can adopt all of them. In our own business, however, we have found them satisfactory, and possibly with some slight changes they may be adaptable to the correspondent's business.

We use the double entry system, which, while more work than the single entry, compels the bookkeeper to be more careful. A trial balance is taken every month and unless the books exactly balance no further posting is done until the error through which a balance is lacking is found and corrected. Any good work on bookkeeping will explain how to open and keep a double entry set of books, therefore I shall not go into details. I shall simply show how we adapt it to our building business.

The principal things we want our books to show are:

How much we owe others.
How much others owe us.
How much each job costs, whether contract or day work.
What our profit or loss is on every operation.

We also want all of this information in such shape that we can find any bill rendered us or that we render any one, and when and how we paid any one or how we were paid. The books to be of their fullest value must have all and more than the above information, and be so entered that it can quickly be found.

In order that the exact cost of any job may be known we, immediately upon starting a job, whether large or small, contract or day work, give it a title and open an account in the ledger. Then as the bills come in they are audited by the partners and superintendents and opposite each charge on a bill the name, initials or number of the job to which the material went is written. If all the items on a bill go to one job the bill as a whole is "job marked." In our office all bills are placed on my desk by the clerk, and when I have marked all of the items I know about I hand the bill along to the others for them to mark the items with which they are familiar. When every item is accounted for and deemed correct, the bill is "O. K.'d" and put in a tray on the bookkeeper's desk. Nothing else is kept in this tray, and the presence of a bill in this tray properly marked and the bill as a whole "O. K.'d" signifies it is ready for posting and the bookkeeper does not have to ask questions.

Now the various jobs are debited according to the markings. In posting a bill to the ledger the date of the bill (not the date of posting) is entered in the date column, then the name of the firm or party rendering it, then in a check space the page of invoice book into which the bill has been pasted is entered, preceded by the letter "I," meaning "Invoice," and lastly the amount of debit. All our bills are pasted into an invoice book and on the stub margin of this invoice book, opposite the bill, is entered the amounts that are to be charged to each job, identified by job name, initials or number. In a conspicuous place on the bill itself, in large figures, is the number of the ledger page upon which is entered the credit to the party or concern rendering the bill. These invoice books, of 200 pages each, fill up very fast, and the bills are pasted into them by beginning at the top and overlapping the bills, so that about 2 in. of the upper part, which contains the heading, dates, &c., is visible, and stopping with the bottom of the bills about even with the bottom of the book. After a book is filled up a label is pasted on the back giving the dates between which the bills run. Thus if six months or 36 months after the job is completed and paid for you wish to find out how much lumber was used or the cost of certain lumber, a reference to the ledger index immediately gives the page of the job account. Here, by running down the charges which are identified by name and making note of the invoice pages of the several bills that are charged as from lumber dealers (thus, I 59-64-80-96-97, &c.) and the date of the first bill, you are enabled to find by a glance at the back of the invoice books the particular book in which the bills of contemporaneous date are filed, and recourse to the pages according to the numbers finds the bills and thus the information you want. You can look up any bill in less time than I have been telling how to do it.

Whenever a bill is paid at our office we immediately turn to this bill in our invoice book and have the party receipt it, or if payment is made for more than one bill we have him receipt all bills that are paid. In this way the greater part of the bills become receipted and the receipts are effectually filed, and the process of finding a bill also finds the receipt. For bills not paid at the office we take regular receipts and file them in an alphabetical file.

All checks, which are consecutively numbered, are pasted back on the stubs from which they were torn as soon as they come back from the bank. The check books are filed so that any particular one wanted can be readily found. If a check is drawn to pay a note or draft, the note or draft when receipted is attached to the check stub and the check is also attached to the stub when returned by the bank.

In crediting cash for all payments made to us by check, the number of the check, the bank on which it is drawn, the date and the amount are entered in the cash book and on the stub of the check book.

In entering the payroll in cash book we enter the date, the bank check number and the amount, preceded by the amount to each job, and this latter amount divided to show how much of it was for carpenters, laborers, masons, &c., thus:

OCTOBER, 1909.
29.

Expense	$32.45
Whittier job: Plasterers, $27.50; expenses, $1.05; masons, $9.60; carpenters, $62.50; laborers, $54.20	154.85
Compton Building job No. 7: Laborer	1.95
Hathaway job No. 3: Laborers, $14.40; carpenters, $19.96; mason, $24	58.36
Lawrence P. O. job: Laborers, $10.40; mason, $9.60; expense, $49.55	69.55
Chelmsford Foundry Company: Express	.40
Taunton job: Laborers, $13.65; carpenters, $113.22; expense, $1.50	128.37
277 Tremont street: Carpenters, $93.22; lathers, $50.35; mason, $17.40; laborers, $61.15; expense, 85 cents	222.97
Studebaker job: Carpenter, $3.84; expense, $1.50	5.34

254 Washington street: Plasterers, $119.06; laborers, $190.97; carpenters, $183.54; expense, $1.75; masons, $56.40; lathers, $22.50	574.22
Thames Bank job: Expense, $6; cleaning brick, $43.43; carpenters, $24; laborers, $260.12; masons, $83.90	417.45
Taplin job: Carpenters	41.50
Pope job: Carpenters	9.00
B. B. Moulton, jobbing: Carpenter	3.84
Sexton job: Masons, $150.20; carpenters, $96.56; laborers, $232.50; engineer, $21.60; expense, 45 cents	501.31
287 Hanover street: Laborers, $13.05; carpenters, $63.65; expense, 40 cents	77.10
2 Park street job No. 2: Carpenter	7.50
P. O. job No. 5: Carpenter, $6; laborers, $7.20	13.20
Shawmut job No. 10: Carpenter	7.71
City Hospital job: Laborer	1.20
Gallison job: Laborer, $2.75; carpenter, $4.32	7.07
Art Museum job: Laborers, $3; carpenters, $145.49; expense, $3.50	151.99
Lawrence Building job No. 1: Plasterers, $11.56; laborers, $11.55; carpenters, $108.60; expense, $1.50	133.21
Taunton job extra: Laborer	1.35

Above payroll by check No. 1917.

When these various amounts are posted to the ledger, the date is entered, followed by the information "Labor," then by cash book page whereon may be found the particulars, and then the total amount, thus:

1909.			
Oct. 29	Labor	C369	$151.99

If you want to look up the cost of a given class of labor on a job, make a memo. of the cash book pages as entered opposite the word "Labor" throughout the entire job account and then refer to cash book where the amount of each class of labor is given. It goes without saying that in order to get the time to the office in such shape as to enable the bookkeeper to make all these divisions a system of time slips must be used that give just this information. The slip which we use has been shown and the use of it explained in various issues of *Carpentry and Building*. The latest explanation of these slips is on pages 162-163 of the May number for 1909. These slips not only give the information above required by the bookkeeper but a great deal more, as a reading of the matter just referred to will show.

A journal is used, but only for such transactions as the cash and invoice books do not show. For instance, upon rendering a bill for a piece of work done or a contract completed, an exact copy of it is put in the journal, and the journal shows that Mr. Blank is charged blank amount as billed and the job (number or name) is credited with the same amount. When the bookkeeper posts to the ledger from journal, the job and the owner's accounts both show in check space the journal page where the particulars of the transaction are to be found, preceded by the letter "J" for "Journal." Thus, if you wanted to see just what you billed to a party, look up his account in the ledger and note the journal page opposite amount of bill with which he is debited and refer to journal for a detailed account.

In order to take care of stock which goes to a job from the shop or locker and stock that may be left over and returned at completion of a job, we carry a "Locker" account. If a carload of spruce was purchased and delivered at the locker, the "Locker" account is charged the invoice of same. Should we take 5000 ft. to a certain job, I make a slip as follows and put it in the bookkeeper's tray:

Credit locker:
5M spruce, $26 .... $130.00
Charge Jones job:
5M spruce, $26 .... $130.00

This transaction goes through the journal with page references, as before explained. If some of this material was left over and returned to the locker, a slip showing a credit to "Jones Job" and a charge to locker is made and put in the tray, and this goes through the journal in same manner as first transaction. In case of stock taken from one job to another, the process is the same. All large reasonably permanent tools or additions to plant are charged to "Locker." All small tools (shovels, hoes, hose, hods, steps, &c.) are charged to the job. This latter is done because of the fact that anything except a very small job wears out a number of such tools, and as a rule nothing of this kind need be bought for a very small job, as they will be taken from the locker with stock when starting the job and afterward returned.

Teaming of stock and tools both ways we always charge to the job, and with us this comes on the teamster's bill and goes through the invoice book and then to the ledger. In case of a man running his own team, a "team account" should be kept and this account credited with a fair charge for the teaming and the job benefited be charged with a corresponding amount. The team account should be debited the entire cost of running the team and the teamster's wages. The balancing of this account at the end of a year's work, after due allowance for depreciation, would show you whether or not it was profitable to keep a team.

The points above touched upon give in general our system, which, as is evident to the reader, is nothing more than straight double entry bookkeeping, with the addition of page reference in ledger accounts, to the journal, cash and invoice books. These page references are what make it possible to immediately find a bill, the particulars of a cash or note transaction, a transfer of stock from shop or locker to a job or from one job to another, or any similar information that may be desired.

One or two other points on the office end of the business which may help to keep matters straight, while not a part of the bookkeeping, are perhaps worth mention in this connection.

We have an alphabetical file for every "live" job, plainly labeled on back with job name, location and name of architect. In this file we put every letter coming to us which has to do with the job—schedules, freight bills, express receipts, very small drawings, &c. In this way everything concerning the job not in the regular books, the job's plan drawer or the letter book, is put where it can be located at short notice. When the job is completed, paid for and all bills of the job paid and we are sure we will not want the matter the file contains, it is emptied and all letters, freight bills, &c., destroyed, with the exception perhaps of a few letters we may want, for some reason, to save. The file is then relabeled and used for another job. Such matter as is kept we put in the other permanent files labeled "Correspondence," "Receipts," &c.

On my desk I have a couple of wire desk trays. Every morning as I go through the mail I put into one tray ever letter, bill, schedule, &c., that must be answered or attended to before the day is over. Into the other tray I put everything that for some reason cannot be attended to at once, but that requires attention in the future. By the time I leave the office at night I will have marked all bills, or had them marked or sent out to the jobs for verification, answered all letters, ordered all schedules of stock, obtained information that may be requested by architects, owners or foremen and transmitted same by letter or 'phone, and thus practically have emptied the tray containing the "present day's matters." The other tray I run through a couple of times a day and put into the first tray anything referring to something that is due for immediate attention, thus getting them before me for action. Appointment slips for some time ahead I put in this "Future matters" tray, as well as marking them upon my pad calendar. A memo. that on a certain date, several weeks ahead, it is about time to call up Blank and see how our terra cotta for the Jones job is coming along, a letter asking for information that cannot be given at once, &c., all go into this tray. A letter such as the last one referred to, if calling for an immediate answer as well as for information to be obtained later, goes into the "present day's work" until answered, and then to the other tray until the final answer is given, and then to the job or general files. It is thus not off my desk until it becomes "dead matter."

I have other little "wrinkles" about the office that are not important in themselves, but I find that they all facilitate matters connected with the business. However, I shall not attempt to explain them here, as I hope I have given the correspondent some points that will be of use to him, and if I keep on writing on this tack much longer the readers may vote me a bore.

SOME PROBLEMS IN STAIRBUILDING.—XII.

By MORRIS WILLIAMS.

A PARTIAL plan of a stairway containing two flights, the bottom one landing on and the upper one starting from a half space platform, is shown in Fig. 77 of the diagrams. Between the two flights is placed a partition. The rail is called a wall rail following the side of the partition at a certain distance from it and winding from the bottom flight around the corners of the partition up to the upper flight.

This kind of a problem is often encountered in practice and unless the stairbuilder has more upon which to rely than luck in fishing out of a book a detailed method of operation it is more than likely he will encounter unsurmountable difficulties. It is astonishing why stairbuilders generally are satisfied to depend upon such unreliable information while a knowledge of the science of handrailing is so simple, as it must appear to be to every one who pays due attention to the elucidations of its fundamental principles as they are explained in these articles.

With the simple knowledge of a method to develop an oblique section cut through a square block, it may be said that wreath hand rails may be scientifically constructed for at least two-thirds of the stairways encountered in practice. The others may be so constructed with the additional knowledge of the method of developing a section cut obliquely through a block of irregular base. Such knowledge as these problems entail may be obtained with but a small amount of intelligent study, and once thoroughly acquired will be the means of solving any and every conditional problem of wreath construction which may possibly occur in practice.

In the plan, Fig. 77, for example, suppose it is desired to construct a square rail around the corners—that is, a rail not having a curve, as indicated by the dotted lines in the diagram. To construct such a rail the problem will be merely to find the section of a square block cut to the pitch the rail will have from the joint *n* on the bottom flight rail to *o*, the center of the rail above the platform.

How to find the pitch is illustrated in the elevation, Fig. 78. Draw the straight line *n a b e o c d m*. The distances between these points are to corrrespond to those in the plan, Fig. 77, bearing the same reference letters shown on the center line of the rail from *n* to *m*.

Place the pitch board at *a*, as shown, Fig. 78, and draw the pitch of the bottom flight continued to *b'*. Upon

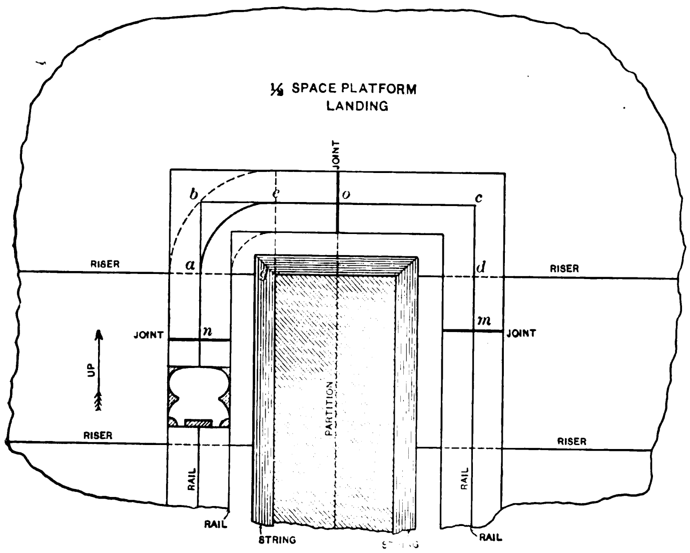


Fig. 77.—Plan of a Stairway with a Wall Rail Following a Partition Between Two Flights from a Half Space Landing.

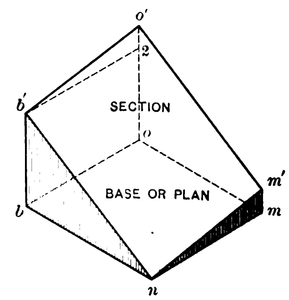


Fig. 79.—View of Fig. 80 Folded in the Form of a Solid Block Showing the Developed Section.

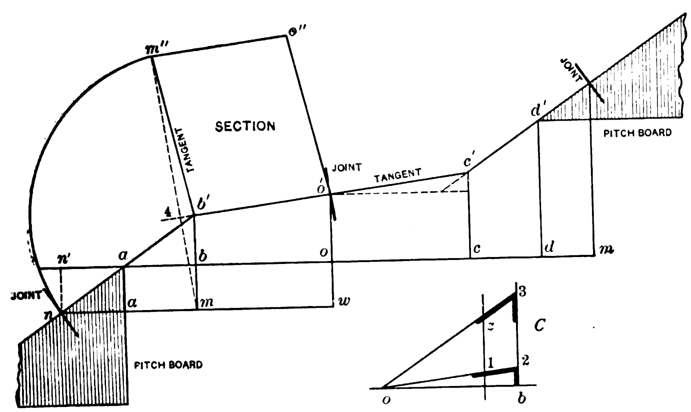


Fig. 78.—Elevation of Steps and Pitch of Tangents.

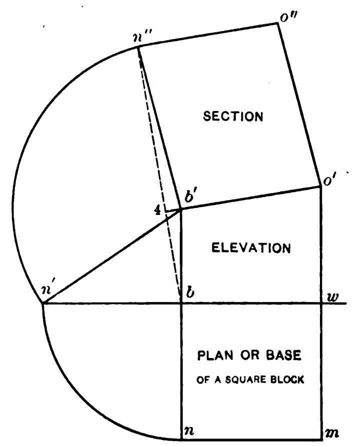


Fig. 80.—Method of Developing a Section Cut Obliquely Through Square Block in Two Directions to Its Axes as Applied in the Development of the Face Mold for a Square Wreath Shown in Figs. 78 and 81.

Some Problems in Stairbuilding.—XII.

d erect a line to *d'* the hight of one riser shown in the plan to be the first riser of the top flight. Now place the pitch board at *d'* and draw the pitch of the top flight continued to *c'*. Draw a line from *c'* through *o'* to *b'*, thus determining the pitch of the rail all around the corners from the bottom flight to the top flight.

Now drop a line from *n'* to *n*, cutting the pitch of the bottom flight at *n* and draw a line to *m*. From *m* draw a line perpendicular to the pitch line *b' o'* through 4 to *m''* and connect *m'' b'*. Now make *o' o''* parallel to *m'' b'* and *m'' o'* parallel to *b' o'*, thus completing the form of the section.

The angle at *b'* will be the angle between the tangents *o' b'* and *b' n''* as required upon the face mold to square the joints.

The process here described as before mentioned is merely that of finding the form of a section cut through a square block along the pitches indicated in Fig. 78 from *n* to *b'* on one side and from *b'* to *o'* on the other side. A view of such a block is given in Fig. 79, where it is shown cut to the pitch of *o' b'* in one direction and in the other direction from *b'* to *n* to the pitch indicated by the line *b' n*.

It is shown in Fig. 80 how to develop the section, and if the method here described is compared with that shown in Fig. 78 to develop the section containing the wreath, and when the two are jointed together at the end *o'* they will cover the distance shown in Figs. 77 and 78 from *n* on the bottom flight rail around the two corners *b* and *c* to *m* on the top flight rail.

If it is desired to curve the rail at the corners as shown by the dotted lines, Fig. 77, from *a* to *e*, the operation will be precisely the same in principle, deviating only in the size of the square to be developed. Fig. 82 shows the latter method of treatment. The size of the plan square in this case will be equal to *a b e g*, shown in Fig. 77. The pitch of the tangents *a b* and *b e* will be the same as the pitches shown over the tangents in Fig. 78, and as shown in Fig. 82 from 5 to 3 and from 3 to *a*. From *b* draw a line through 4 perpendicular to the tangent 3 5. Revolve the point *a* to this line, as shown by the arc represented by the dotted line from *a* to *w*. Connect *w* with 3 and complete the square of the section by drawing parallel lines, as indicated by the dotted lines *w m* and *m* 5. The center line only of the face mold is shown in this diagram as from *w* to 5; the remaining portions as from 5 to *o'* and from *w* to *n'* will be straight, and are called the "shank."

Next will be illustrated in Fig. 83 the method of drawing the face mold complete. Draw the line *a'* 4 3 5 *o'* and make the distances between the points indicated equal to those shown in Fig. 82 between corresponding

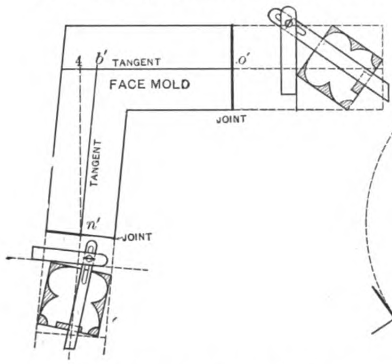


Fig. 81.—Face Mold for a Square Rail Around the Corners Shown in Plan, Fig. 77.

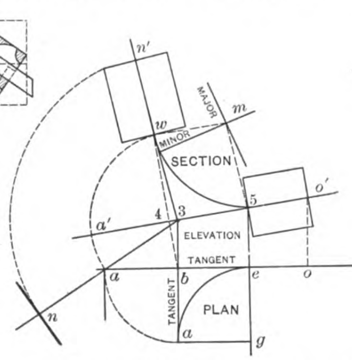


Fig. 82.—Elevation and Pitch Line of Tangents for a Curved Rail.

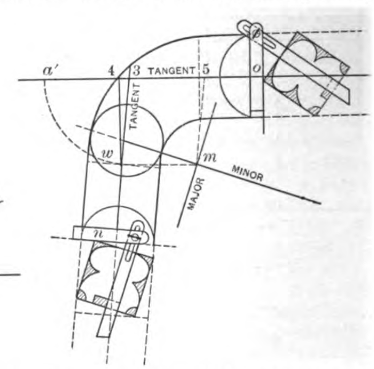


Fig. 83.—Face Mold for a Curved Rail Around the Corners Shown in Plan, Fig. 77.

Some Problems in Stairbuilding.—XII.

face mold for the square wreath, the two methods will be found to be similar.

Referring to Fig. 80, let *m n b w* represent the plan of a square block, the side of the square being obtained from the plan rail shown in Fig. 77, from *n* to *b* on the center line. The pitches to which to cut through the block are obtained from the elevation, Fig. 78. Make *w o'*, in Fig. 80, equal to *w o'* of Fig. 78, and make *b b'* of Fig. 80 equal to *m b'* of Fig. 78. By connecting *o'* with *b'* and *b'* with *n'* in Fig. 80 we will have the same pitches as shown in Fig. 78 at *o' b'* and *b' n*.

To develop the section all that is necessary is to draw a line from *b* square to *o' b'* through 4 to *n''*, and connect *n''* to *b'*. To complete the section draw parallel lines to *n'' b'* and *b' o'*, as shown. Now compare this section with that shown in Fig. 78. After the form of the section is thus found it is demonstrated in Fig. 81 how simple becomes the process of laying out the face mold. Make 4 *b' o'* of this figure equal to 4 *b' o'* of Fig. 78 or Fig. 80. From 4 draw a perpendicular line to *n'* and connect *n'* with *b'*. The line *n' b'* must equal the length of the bottom tangent *n b'* shown in Fig. 78. Make the joint at *n'* square to *n' b'*, and at the end *o'* square to *b' o'*.

Place on each side of *n'* the distance shown at 1 2 on the bevel in diagram C and on each side of *o'* the distance shown at *z* 3 on the other bevel in the same diagram. Complete the face mold by drawing lines from these points parallel to the tangents as shown.

The bevels are shown at each end of the mold applied parallel to the joint toward the inside at the end *n'*, and at the end *o'* toward the outside.

This face mold will answer for the two sections of the numbers. From 4 in Fig. 83 draw a perpendicular line to *w* and connect *w* with 3, which will be the bottom tangent as required upon the face mold; the upper tangent will be the line 3 5. The angle between the two as required to direct each tangent to square the joints at each end is shown at 3.

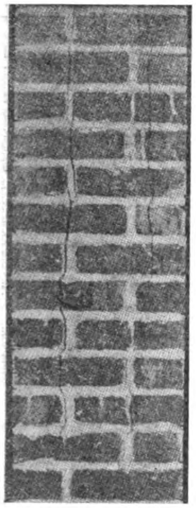
Now find the minor and major axis and draw the inside and outside curves as shown. From *w* to *n* and from 5 to *o* will be straight.

The bevels are applied in this case the same as shown in Fig. 81, and they are equal bevels, owing to the tangents in both cases being equally inclined.

THE new structure in course of erection on Chambers street, facing City Hall Park, New York City, has a frontage of 123 ft. in Chambers street and 125 ft. in Reade street and will be 151 ft. deep. It will be 15 stories in hight and will have a facade of Indiana limestone resting on a base of granite. The courts will be open on the streets, so that every room will have direct light. There will be hot and cold water in each office, vacuum cleaners and express, holiday, Sunday and all night elevator service. The plumbing, drainage, water supply, heating, electric and elevator services have been designed to give the highest excellence in sanitation and comfort. The hallways, floors and entrances from Reade and Chambers streets will be of solid marble, while the staircases will be of bronze, in richly ornamented design. The architect of the new structure is Raymond F. Almirall, and the contract is being executed by Charles T. Wills for the Emigrant Industrial Savings Bank, which will occupy the ground and basement floors.

TESTS OF BRICK AND TERRA COTTA BLOCK COLUMNS.

THE results of some exceedingly interesting tests of brick and terra cotta block columns made at the Engineering Experiment Station of the University of Illinois are reported by Arthur N. Talbot and Duff A. Abrams, in Bulletin No. 27, from which we take the following particulars:



For brick, stone and terra cotta masonry structures designers commonly use stresses which are low in comparison with the strength of the constituent materials. Various reasons exist for this—possible variations in material, chance for poor workmanship, opportunity for settlement and resulting unconsidered stresses, the desire to avoid tensile stresses in masonry, imperfect knowledge of the properties of the completed structure, &c. In some types of structure mass and volume are important considerations and strength is subordinate. In many applications, however, the strength of the structure is of first importance, and a knowledge of the actual properties of the structure is essential to safe and economical construction. Frequently designers use stresses as high as their information and the usual rules of practice will permit and make sections as small as these considerations warrant. The utilization of the working capacity of a structure is generally advantageous. This is especially true when the better grades of material are used and when the workmanship is known to be first class. Much information is available on the strength and other properties of constituent materials like mortar, brick, stone and terra cotta, but relatively little is known of the properties of built-up structures. Anything that adds to our knowledge of such construction should be helpful; and it was with a view of obtaining further information on the properties of short built-up columns or piers that the tests herein described were undertaken.

Dimensions of the Columns.

The work described in this bulletin includes tests of 16 short columns or piers of brick and 16 columns built of terra cotta blocks. Although long column action seems not to enter into these compression test pieces, they will be termed columns by analogy to the use of the term column for other compression members of no greater slenderness ratio. The length varied from 10 ft. to 12½ ft. In lateral dimensions the brick columns were 12½ x 12½ in., and in the terra cotta block columns the range was from 8½ x 8½ in. to 17½ x 17½ in. The brick used in the construction of the columns were of two grades—an excellent class of building brick and a soft grade selected as representative of inferior brick. The terra cotta blocks were of good quality. Different qualities of mortar and different grades of workmanship were used. The loads were applied continuously to failure in most cases, but tests were also made with repeated applications of the same load. Central loading of the column was used in most cases, but in some tests the load was applied eccentrically.

All the tests were made in the 600,000 lb. Riehle vertical screw testing machine in the Laboratory of Applied Mechanics of the University of Illinois. The machine head moved at the rate of 0.05 inches per minute; except in some cases, where the load was repeated, when a speed of 0.10 in. per minute was used. The load was generally applied by increments of about 25,000 lb. on the column, but for the columns built of lean mortar or of clay brick the increment was smaller. The load was applied through a spherical bearing block, except where the column was loaded eccentrically. In arranging the columns for eccentric loading, a ½-in. square steel bar about 20 in. long was placed 1 in. off the center of the column under the lower bearing block, and a similar bar in a corresponding position on top of the upper bearing block. The load was applied to the column through these bars.

In all of the brick column tests the first evidence of distress observed was a faint popping sound which seemed to proceed from the interior of the column. As the load was increased the popping noises were heard more frequently and were louder. As the load was further increased the action of the columns depended to a great extent on the quality of the mortar used. The columns in which the richer and stronger mortar was used gave little or no additional evidence of distress until a load a little below the maximum was reached, when spalling of the mortar at the corners of the column, or the formation of longitudinal cracks through the vertical joints gave warning of impending failure; after the beginning of spalling or the formation of longitudinal cracks was observed, the failure was generally very sudden and complete. In this class of columns (those with 1-3 Portland cement mortar) the debris showed that failure was precipitated by the formation of longitudinal cracks through each vertical joint. These cracks generally extended throughout about the upper two-thirds of the length of the column, beginning near the middle and extending both ways. Such failures were extremely violent and sometimes involved hazard to observers and often proved destructive to measuring instruments. The failures came with such slight warning that, despite repeated efforts, the operator was unable, except in two tests, to stop the movement of the testing machine after evidences of failure were observed in time to avoid reducing the upper two-thirds of the column to a mass of broken bricks and mortar scattered over the laboratory. The design of this machine is such that it may be stopped and the motion completely reversed almost instantly. The columns referred to were the ones laid up carelessly. They were less rigid than the others of the same materials and hence took on load more slowly.

Features of the Tests.

The phenomena of the test of the clay-brick columns did not differ greatly from those of shale brick with 1:3 Portland cement mortar, except that on account of the reduced rigidity the load was applied more slowly and the failures were less sudden and violent.

The failures of the columns in which the 1:5 Portland cement, natural cement or lime mortar was used were similar to those described above, except that they rarely got beyond the spalling and cracking stage. In these tests the formation of the vertical cracks could readily be observed. The freedom from sudden collapse was probably due to the yielding of the joints and the fact that the testing machine does not follow such yielding instantaneously. It must not be inferred that under an actual load such columns would not have failed as suddenly and completely as the others. Where natural cement or lime mortar was used the mortar gradually disintegrated and reduced to powder.

No direct comparison of the strength of the lime mortar columns with the strength of the mortar can be made (since no tests of the lime mortar were made), although it is evident that the low values observed are due to the low crushing strength of the mortar. From the action of these columns during the tests it seems evident that the lime mortar broke down at a load which was proportionally very much lower than that carried by the cement mortar. From the early signs of distress exhibited by these columns it seems doubtful if they would continue to carry a load greater than about one-third the maximum load given in the test, while for the shale brick columns built with Portland cement mortar, the load at which the first signs of distress were observed is from 50 per cent. to 75 per cent. of the maximum load carried.

For the two columns built of underburned clay brick and 1 : 3 Portland cement mortar, the average load carried was 1060 lb. per square inch. The ratio of this load to the load taken by the shale brick columns tested at the same age is 0.31. The ratio of the crushing strength of the clay brick to that of the shale brick is 0.37.

It is evident that the strength of any brick or block structure is influenced greatly by the quality of the mortar used. These comparisons indicate that for the columns tested the strength of columns built from the same brick is closely proportional to the strength of the mortar used in their construction, and the strength of columns built of different brick using the same mortar is closely proportional to the crushing strength of the brick. Of course, these conclusions may not be expected to hold for all combinations of brick and mortar. A mortar might be used of such low crushing strength that the strength of the poorest brick would be great in comparison.

These tests indicate that the crushing strength of the brick is as important a factor in the strength of a structure of this kind as the quality of the mortar used. The most economical structure would seem to result from using a mortar comparable in strength with the brick. Such considerations are generally unnecessary except in design of columns, piers, &c., which are to sustain excessive unit loads.

If the load at which the column first shows signs of distress by popping sounds represents the maximum permanent load which the column would carry, then this load is the one on which the factor of safety should be based, and not the load carried momentarily before failure.

The terra cotta clock columns were built and tested in two lots, an interval of about one year separating the times of making the tests. The cement used was the same brand in both years though the lots were different. The columns were generally made in sets of two, each set being constructed and loaded similarly. The tests resembled those of the brick columns in many respects.

The Terra Cotta Columns.

Generally the terra cotta block columns gave no signs of distress until a load near the maximum was applied, when cracking noises similar to those described for the brick columns were heard. This was soon followed by the formation of longitudinal cracks through the vertical joints or the spalling of the horizontal mortar joints at the corners of the column, either of which was immediately followed by sudden collapse of the column. The failure of these columns were even more violent than those described for the brick columns. The smaller columns showed more variation in the manner of failure than the large ones. The characteristic form of failure for the 12½ x 12½ in. columns was a sudden total collapse immediately following the appearance of longitudinal cracks through the vertical joints near the middle. Failure sometimes occurred with no warning except the continued shortening of the column under the increasing load.

The columns loaded eccentrically failed by splitting from end to end along the vertical mortar joint which was parallel to and nearer the loading bar.

Both brick columns and terra cotta block columns gave high strengths in all cases where strong mortar and care in buildings were used. For central loading, the strength of the brick columns ranged from 3220 to 4110 lb. per square inch, and the strength of the terra cotta block columns from 2700 to 3790 lb. per square inch, the columns having the highest resistance not failing at the full capacity of the machine. The effect of the strength of the mortar is apparent in the carrying capacity developed in the columns; lower loads were found in columns built with 1-5 Portland cement mortar than in those with 1-3 Portland cement mortar, still lower loads in those with 1-3 natural cement mortar, and still lower loads in those having 1-2 lime mortar. The effect of the quality of the brick is shown in the columns made with inferior brick, which carried only 31 per cent. as much as columns built with the better grade of brick. In the case of the terra cotta columns, the blocks which were culled out as somewhat inferior gave a column strength perhaps 30 per cent. less than the columns built with superior blocks. The effect of the attempt to represent hurried or careless workmanship in two brick columns and in three terra cotta block columns was a loss in strength of about 15 and 25 per cent., respectively.

The ratio of the strength of the columns to the comprehensive strength of the individual brick and block is of interest. In the well built brick columns loaded centrally the ratio of strength of column to compressive strength of individual brick ranged from 0.31 to 0.37, and in the underburned clay brick column the ratio was 0.27. In the terra cotta block columns with central loading the ratio of strength of column to that of individual block was 0.74 for the incompleted test and 0.83, 0.85 and 0.89 for the others. If, as seeems to be the case the strength of the brick or block to resist cross breaking is an element in determining the strength of the built-up column, a deeper or thicker brick would give higher column strength. It is possible that this partially accounts for the fact that the ratio is found to be higher for terra cotta block columns than for brick columns. The tests suggest that the ability of individual pieces to resist transverse strength is an important element in the strength of the completed column. This suggestion may have an important bearing on the advantageous size of the component blocks which may be used in a compression piece where high strength is desired.

Strength of the Columns.

The strength of the column is greater than the strength of the mortar cubes in both brick and terra cotta block columns, excepting only the soft brick columns which had brick of low compressive strength. It is evident that the strength of individual brick or blocks and the strength of the mortar both enter into the resistance of the column. The relative effect of the two depends upon the character of the material. It is evident, however, that the better the individual piece the more important it is to have a mortar of high resisting strength.

The results obtained in applying the load eccentrically were found to agree very well with those obtained from ordinary analysis. When the amount of eccentricity in the application of the load is known or may be estimated closely, the ability of the column to resist this action may be calculated quite closely. It is apparent from the results that the calculated resisting stress in the column on the side of maximum compression is higher than that which causes failure in centrally loaded columns. The higher stress developed with eccentric loading is probably due to the influence of the restraint of the less stressed interior portion. The tests made by applying and releasing a single load a number of times gave failures at loads below those which produced failure in similar columns at a single application of the load. The phenomenon is common in materials of the nature of brick and terra cotta.

Quality of Workmanship.

It is apparent that the quality of workmanship in laying up such columns has an important bearing upon the resisting strength. The work of building columns, however, is not difficult and requires only ordinary care. Full joints and an even bearing are important, and the ordinary workman ought to be able to construct columns of high strength. In the tests made on columns intended to represent poor or careless workmanship the decrease in strength was not as much as anticipated. However, it must be understood that careful and trustworthy work is essential and that a few poor joints will materially reduce the strength of the structure. Wherever good material and good workmanship are insured the strength of masonry of this kind may be utilized with advantage.

Smallest House in Paris.

The smallest house in Paris is said to be situated in the curious Rue de la Bucherie, which formerly was devoted to the sale of firewood and wooden buoys. The house in question is No. 37. Crushed under a high roof, this little place is only one story and contains two small windows. It dates from the end of the sixteenth century and makes a singular contrast with the high buildings which surround it. One of these was for a long time the studio of the celebrated painter, Gustave Courbet, and there he is supposed to have painted some of his principal works.

A "Scale House" of Reinforced Concrete.

A rather interesting example of the use of reinforced concrete is found in the construction of a building shown herewith which has an inside measurement of only 13 ft. 8 in. by 6 ft. in plan. The hight from the floor to the slope of the roof is 9 ft. The roof is reinforced with an I-beam in the ridge, the ends being supported in the gable walls, over which are placed ½-in. rods spaced every 6 in. and terminating at the eaves. Each corner is reinforced with five ½-in. bent rods.

The floor is reinforced with ½-in. rods spaced every 6 in., and there are three ¾-in. round bars which serve as reinforcement for the portion above each long window. Under each side wall the building is supported by a double 12-in. I-beam girder. The thickness of the walls of the building are 8½ in., while the roof and the floor are each 4½ in. thick. The building in question is the Scale House, recently erected at Lorain, Ohio, in connection with some improvements carried out by the National Tube Company. The illustration presented herewith, for which we are indebted to Bulletin No. 65 of the Universal Portland Cement Company, clearly shows the appearance of the scale house and the size of the windows in each side. These occupy so much space that the building appears to consist essentially of four corner posts supporting a concrete roof.

A Scale House of Reinforced Concrete.

Another reinforced concrete building was erected at the same time, this being designed for the storage of patterns. The structure consists of six two-story compartments each 37 x 20 ft. in size. The lower story has a hight of 14 ft. in the clear, while the upper story is about 13 ft. high in front and 10 ft. in hight at the rear. The floor is of concrete 8 in. thick laid on a cinder bed. The second floor consists of 6 in. of concrete reinforced with four I-beams spaced 7 ft. 5 in. apart and two 15-in. channels anchored in the walls. Over the I-beams are laid ½-in rods terminating in the outside walls and spaced about 6 in. apart. The roof consists of 6 in. of concrete with lighter reinforcement and the same spacing. All partitions and side walls are of concrete 13 in. thick. There are six openings in front for the bottom door frames and six in front for the top doors. All concrete foundation walls are 2 ft. thick.

Some Famous Masonry Arches.

As far back as the end of the fourteenth century history records that some daring engineer threw across the River Adda, near Trezzo, Italy, an arch of stone masonry of about 250-ft. span, says a writer in one of our exchanges. For about 40 years it remained, pointed out, no doubt, by the inhabitants of the district, as the ninth wonder of the world, but in 1416, one of the bands of marauders then engaged in interprovincial war razed it to the ground, leaving only the abutments, which are now standing. Had this bridge survived malicious assault and the test of time it would have stood over 500 years as the longest masonry arch in the world, for it was not until 1902 that the span was passed in the 277-ft. Luxembourg bridge.

In contrast to this long period of inactivity in the past, hardly a year now goes by that does not see the announcement of some record breaking masonry span. The start of this construction was in the beginning of the nineteenth century, when the 200-ft. Grosvenor arch in England and the span at Turin, Italy, of similar length, were completed. These held the palm until 1864, when General Meigs completed his 220-ft. Cabin John Arch to carry the Washington (D. C.) Aqueduct. For nearly 40 years this grand span was not surpassed, until in 1902 the Luxembourg arch was finished, to be followed closely, in 1905, by the 295-ft. Plauen arch, the largest existing masonry arch in the world.

Night Classes in Concrete and Building Construction.

A number of new courses have been added to the classes conducted by the Y. M. C. A. at 143 Fourth street, Milwaukee, Wis., which are of special interest not only to apprentices and young men engaged in the building trades, but some of them are designed for the benefit of foremen, contractors, superintendents, &c. There is a class in concrete under the direction of William C. Rath, who was the concrete inspector on the new city auditorium, and there is a course in reading architects' drawing and estimating, conducted by E. H. Ellis of the Northern Construction Company. There are also classes in architectural drawing taught by C. C. Hosmer of the architectural firm of Betts & Hosmer, and a class in structural steel work taught by Richard W. Runge of the Wisconsin Bridge & Iron Company.

The course in concrete construction consists of two terms of 11 weeks each, a portion of the time to be devoted to practical work dealing with the construction of walls, sidewalks, &c. The course deals first with concrete construction in general, practical testing of ingredients, mixing, "forms," placing concrete, &c., and second, the theory and methods of calculating and designing of reinforced concrete, including the practical mathematics required.

The course in reading architects' drawings and estimating is one which cannot fail to be greatly appreciated, as the ability to read drawings and to figure quickly from them is of vast importance to the practical builder, a thorough knowledge of the subject often meaning all the difference between success and failure in the carrying out of building contracts.

Another class entirely new this year is a special course in sheet metal drawing, which will be found of unusual benefit to sheet metal workers who are called upon to lay out their own patterns and deal with the practical problems arising in everyday work.

Strength of Bricks Made of Roman Cement.

Consul Isaac A. Manning of La Guaira furnishes the following official statistics concerning the tensile resistance of Roman cement manufactured at the Venezuelan national cement factory at Caracas, with the pressure per square centimeter (0.1550 sq. in.):

Four bricks of pure cement, made on May 31 and tested on June 28, broke at a pressure of 125.7, 131, 127.8 and 140 in., respectively, and three briquettes, made and tested on same dates, one part cement and three parts sand, broke at a pressure of 70.5, 77.1 and 69.4 in., respectively. Various bricks made July 6 and tested on July 26 resulted in an average resistance, for those made of pure cement, of 129 in., and those one part cement and three parts sand, of 73 in. A pure six-day cement brick broke at a pressure of 76 in. On August 4 six briquettes, made on July 6, three of pure cement and three of one part cement and three of sand, broke at a pressure of 116.8, 132.2, 116.8 and 65, 66 and 76 in., respectively.

The German standard was used in the figuring tests.

SCHOOLHOUSE FOR A LOUISIANA PARISH.

WE take pleasure in bringing to the attention of our readers the construction and arrangement of a school building designed for erection for the School Board of St. John, the Baptist parish in the State of Louisiana. An inspection of the plans will show that there are two classrooms upon the main floor and an assembly hall 34 x 63 ft. in size occupying the entire second story of the building. There are stairs leading from the main hall on the first floor to the assembly hall and there are also commodious flights outside at the rear for rapid exit from the assembly hall on the second floor.

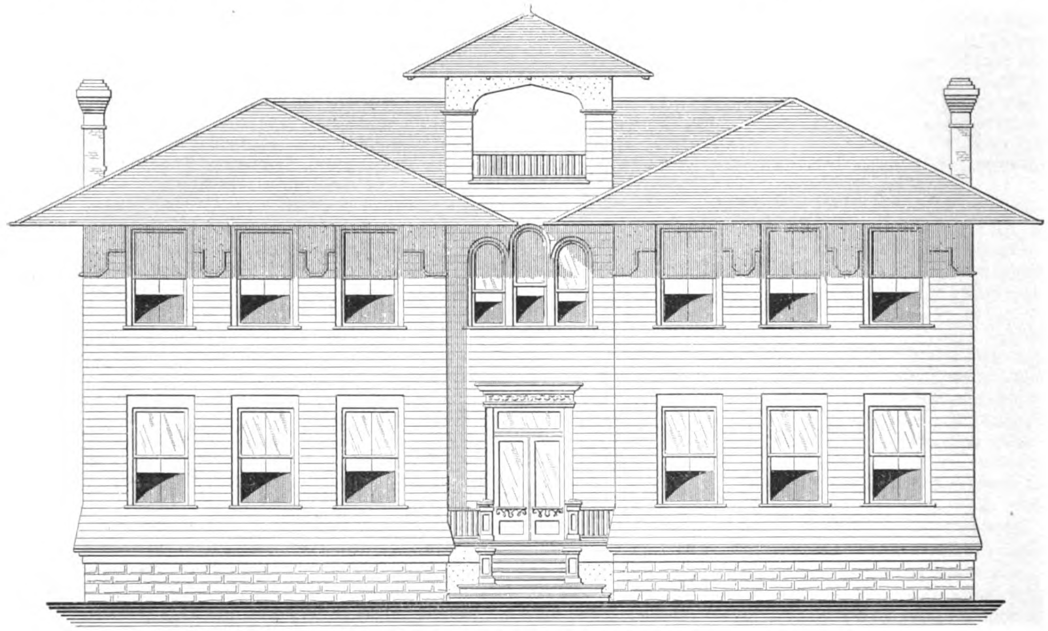
According to the specifications of the architect, J. Charles Valadie, 842 Audubon Building, New Orleans, La., the structure is to be of frame well braced throughout. All timber except otherwise mentioned is to be of hard pine in grades as specified, and of the following dimensions: Sills, 6 x 8 in.; posts, 4 x 8 in.; ledger boards, 2 x 6 in.; studding, 2 x 4 in., all of what is known as "B" grade. The braces, partition caps and partition soles are to be 2 x 4 in.; the first floor joists 2 x 10 in. and well driven up. The steps leading to the main entrance are to have a rise of 7⅛ in. to a run of 10 in., all stringers being 2 x 10 in. The risers are to be of ⅞ in. cypress and the treads 1½ in. pine.

The rooms of the building are to be lathed and plastered with two-coat work, the last coat to be a sand finish and well floated. A hard plaster wainscoting is also to be provided as shown.

All interior finish is to be of clear faced cypress and all door and window frames to have plain casings. The sash are to be double hung with sash cord and weights. The doors are to be of cypress 1⅜ in. thick with cross panels. The interior stairs are to be plain with square nosings and scotia molding. The newel posts are to be of mission style and all rails and balustrade to be square.

The interior floors are to be of tongued and grooved ⅞ x 4¼ in. pine, mill dressed and "C" grade. The porch floors are to be of the same material, but with joints laid in white lead.

The pupils' toilet is to be constructed with 1 x 12 in.



Front Elevation.—Scale, 3-32 In. to the Foot.

Schoolhouse for a Louisiana Parish.—J. Charles Valadie, Architect, 842 Audubon Building, New Orleans, La.

and placed 20 in. on centers; the second floor joists 3 x 12 in. and placed 16 in. on centers; the plates doubled 2 x 4 in.; the ceiling joists 2 x 8 in., the latter placed 16 in. on centers; the rafters 2 x 6 in. placed 24 in. on centers; the porch girders 2 x 4 in., and the porch joists 2 x 8 in., all being of what is designated as "C" grade. All sills are to be halved at the angles and the corner posts and window studs are to be framed to the sills. The joists are to be doubled under all partitions that run parallel to them. All floors are to have rows of 1 x 3 in. pine bridging every 8 ft. The porch joists are pitched 1 in. in 5 ft. away from the building.

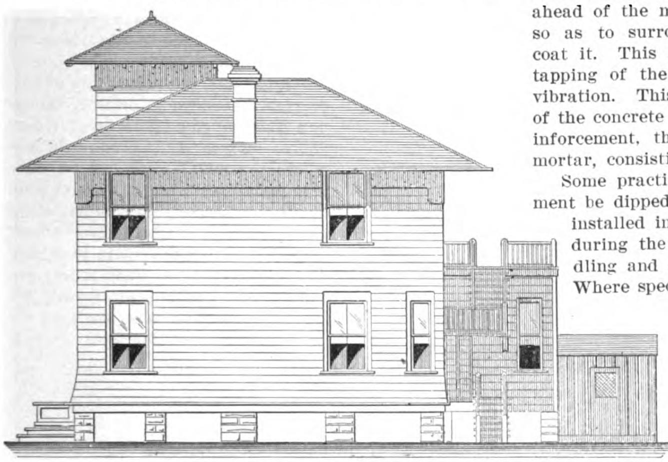
All exterior walls are to be covered with ½ x 6 in. weatherboards with a 1½-in. lap. The weatherboards are to be mitered at the corners and be brought down in a curve as shown on the elevations. The roof is to be framed in the strongest possible manner and covered with ⅞ in. boarding with a 2-in. space between each strip, the boarding varying in width from 6 to 12 in. The roof is to be finished with slate, all hips and ridges being of galvanized iron. Where shown on the plan a good three-ply composition roofing is to be applied. The bell tower is to be ceiled with ⅞ x 4¼ in. beaded ceiling, blind nailed boarding with ⅜ x 3 in. battens over the joints. Around this building 4 x 6 in. sills are to be used and 2 x 6 in. rafters for the roof, the latter being covered with boarding the same as the main roof. Over the boards is to be placed galvanized iron No. 26 gauge V-crimp roofing.

The teachers' rest room, or toilet, is to be fitted with fixtures as indicated on the plan. The lavatory is to be of enameled iron and the watercloset of the washdown pattern, with low down tank. The pupils' toilets are to be fitted with washout closets in series and not separately, as shown on the drawings. They are to be of iron and connect with the cesspool by means of 6 in. terracotta pipes. The fixtures in the teachers' rooms are to be nickel plated and all others are to be painted. The cost of the school building is estimated to approximate $4200 in the section mentioned.

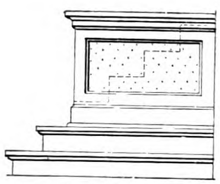
IN the recent sale of the Gilsey House, at the corner of Broadway and Twenty-ninth street, New York City, a famous hostelry, which has done service for more than 40 years, having been erected in 1870, passes into the hands of those who will soon erect upon its site a 20-story office building, plans for which are now being drawn by James R. Gordon, 402 Fifth avenue. The new building will be put up by John E. Olson, 39 East Twenty-eighth street, the general contractor.

Prevention of Rust in Reinforcement for Concrete.

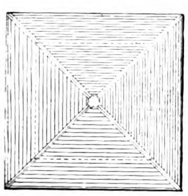
At a period when the literature of concrete is being read with more than usual interest by all engaged in building operations of any magnitude, the following points on the subject indicated by the above heading,



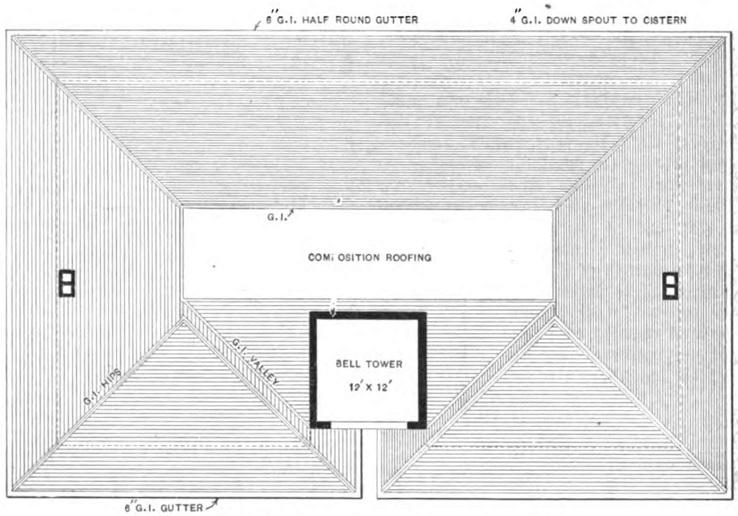
Side (Right) Elevation.—Scale, 3-32 In. to the Foot.



Detail of Front Steps. —Scale, ¼ In. to the Foot.



Roof of Bell Tower.—Scale, 1-16 In. to the Foot.



Plan of Roof.—Scale, 1-16 In. to the Foot.

Schoolhouse for a Louisiana Parish.

taken from a very attractive handbook entitled "Dragon" Portland Cement, sent out by the Lawrence Portland Cement Company, are likely to command no little attention on the part of architects and building contractors the country over:

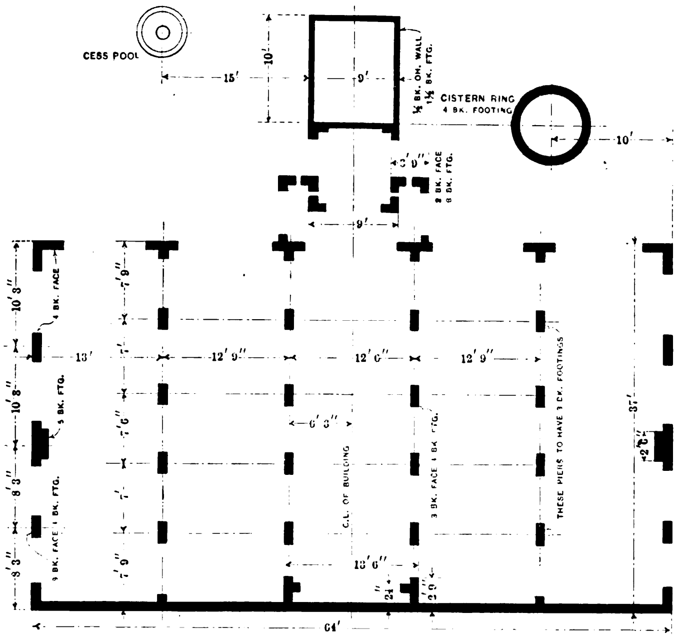
Two theories exist with regard to the action which takes place when iron and steel corrodes. One is that this action is electrolytic in nature, while the other considers that the reaction is purely chemical. In either case moisture is essential, while with regard to the purely chemical theory an excess of oxygen or other oxidizing agent is required.

Pure cement, with its slight alkaline reaction, when applied in a continuous coating over the surface of a steel or iron rod or other shape, has been found to act as a preservative of high order. Paints are actively exploited which contain as the principal ingredient Portland cement either as manufactured for usual purposes or produced synthetically with this particular object in view. In every instance it is obvious that an absolutely continuous film of cement must be applied to the steel surface. In reinforced concrete work this is secured by properly proportioning the concrete mixture so that the cement and water forms a grout which can be worked against the reinforcement rods, and if properly done will coat them in the required manner. With this in view a slight excess of water is required, and it is necessary that in the case of floor slabs, beams and girders the mortar from the concrete be constantly made to flow ahead of the majority of the material being deposited, so as to surround the reinforcement and thoroughly coat it. This action is largely facilitated by a gentle tapping of the reinforcement which produces a slight vibration. This acts so as to keep the larger particles of the concrete pushed away from the surface of the reinforcement, the space between being filled with the mortar, consisting largely of cement.

Some practitioners have required that all reinforcement be dipped in a bath of cement grout before being installed in the forms, but by careful manipulation during the deposit of the concrete this extra handling and cost is unnecessary and can be obviated. Where special care has not been taken, however, reinforcing rods have been uncovered after a few years and found nothing but a streak of rust.

In the case of cement work which is applied under the trowel, such as stucco, &c., or where the reinforcement is in such a shape that it cannot be manipulated so as to secure the complete coating of its surface with grout, it becomes necessary because of the perviousness of such stucco or concrete to the action of air and water, to supply other methods of preventing the rusting of the reinforcement. Where heavy steel beams are used as grillages, for instance, or in the floor systems of composite bridges, subways, &c., it is very essential that rust be prevented and that stray electric currents are not allowed to attack the metal structure. Various coatings have been devised, some of which are claimed to be of high resisting power against moisture and electricity, and many experiments have been performed to discover their real virtues. A high grade of asphalt or coal tar pitch, when uniformly applied to a thoroughly cleaned structure which is not so cold that the pitch hardens so rapidly as to become brittle, has been found particularly effective.

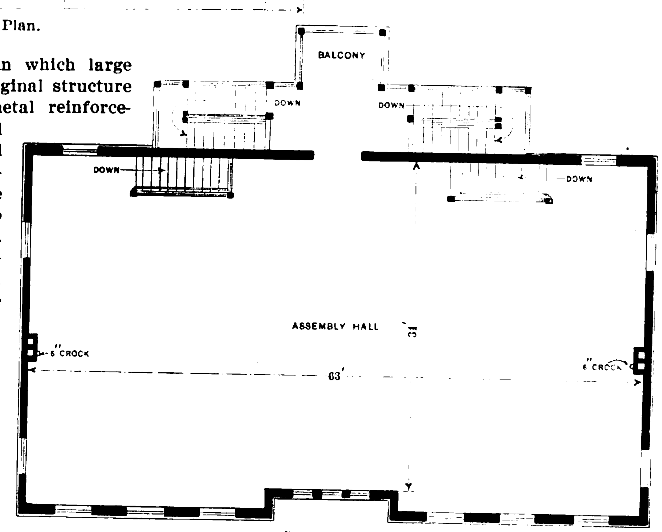
In the case of stucco greater trouble has been experi-



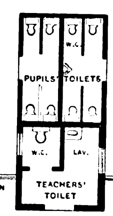
Foundation Plan.

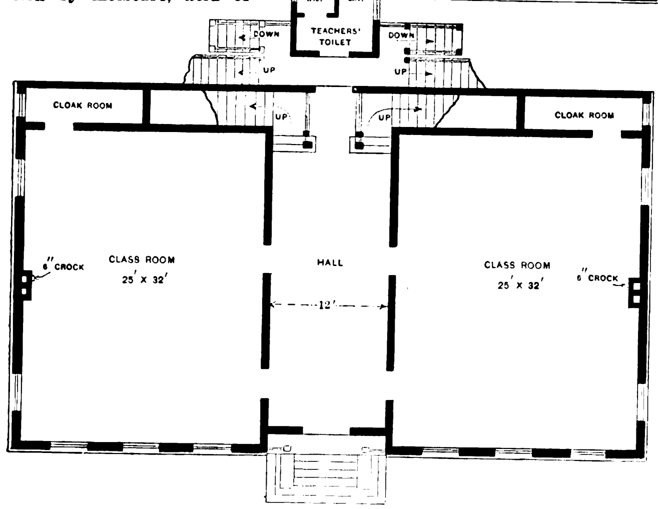
enced, and many instances are known in which large areas have become separated from the original structure because of complete corrosion of the metal reinforcement, resulting in much unsightliness and some absolute danger. Here, again, special coatings for the metal work have been employed. Proprietary compounds, to be added to the cement in a dry state or to the cement mortar in the form of a liquid, are also widely advertised. They are supposed to make the stucco waterproof and hence prevent the possibility of rust in the metal work on which the stucco is placed. Finally, exterior coatings over the surface of the finished work are often applied. Doubtless the most perfect of these is wax, which is driven into the cement work under heat and remains as a perfect preventive of any action by moisture, acid or alkali so long as the stucco does not crack and allow entrance of some destructive agent through capillary action. Were it possible to use the pure cement directly against and completely covering the wire lath or other metal work on which the stucco is placed the necessity of these other devices above mentioned would be obviated, but a stucco mixed rich enough to produce this effect would be too costly under ordinary circumstances, and resort can better be made to other methods for economic reasons.

In general, the preventing of rust on steel imbedded in cement mortar and concrete can be obviated where dense masses are produced and where the metal work can be completely coated with a rich cement mixture. Where this condition has been found to exist reinforcement has been known to remain in a condition as perfect as when it left the rolling mills, even after severe exposure of the concrete work to destructive agencies for long periods extending over as many as 15 or 20 years.



Second Floor.





Main Floor.

Schoolhouse for a Louisiana Parish.—Floor Plans.—Scale, 1-16 In. to the Foot.

Short Method of Estimating Stonework.

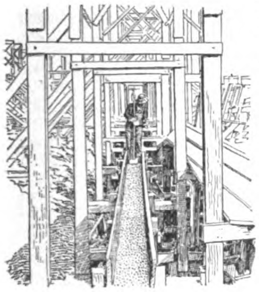
Multiply the length in feet by the hight in feet and that by the thickness in feet, and then divide the result by 22. The answer will be the number of perches of stone work.

For approximate results, multiply the length in feet by the hight in feet and by the thickness in feet, and the result by 4, cutting off the two right hand figures. The product will be the required number of perches of stone.

A GASOLINE ENGINE in a woodworking institution should have pump feed, and the reservoir should be outside, distant at least 30 ft. from the building and below the level of the engine.

WHAT BUILDERS ARE DOING.

FOR the first time in several months the total of building operations of the country shows a slight falling off as compared with the corresponding period a year ago. This is due in a large measure to the heavy shrinkage in some of the principal cities of the country, traceable to the fact that last year a number of notable commercial buildings were projected involving a large estimated expenditure in their erection, while this year there has been somewhat less work of this nature undertaken, so that the showing is less favorable than would otherwise be the case. In New York City particularly this shrinkage is unusually heavy, the expenditure for office buildings in October last year having been placed at practically $8,700,000 for seven mammoth structures, while in October this year it is only $330,000, covering a single operation. Some of the other cities showing heavy decreases are St. Louis, Brooklyn, Indianapolis, Milwaukee and Denver. Offsetting this condition, however, phenomenal increases are to be noted in many of the smaller cities of the country, although the capital involved in the building operations is not necessarily large. There is a feeling that with the momentum which building operations have attained all over the country, the coming season will witness an unusual degree of activity, more especially as other lines of industry are moving at a rate which bespeaks a most gratifying period of prosperity.



Baltimore, Md.

Building Inspector Preston shows in his report of building operations for October that with the exception of April and July it was the largest month of the year. It is customary here in figuring the cost of building improvements to add 20 per cent. for undervaluation, which would bring the figures for October slightly over the eleven hundred thousand dollar mark. Here, as in some of the other cities of the country, and especially Philadelphia, dwelling houses constitute an important factor in the grand total. According to the figures of Inspector Preston permits were issued for 280 brick dwellings, two stories in hight, to cost $312,960, and for eight frame dwellings to cost $30,781. A new hospital is projected to cost $200,000, a city school to cost $114,660 and nine manufacturing buildings and warehouses involving an estimated outlay of $119,000.

The total estimated cost of new improvements for which the 141 permits were issued, together with the estimated cost of 38 additions, is $923,942; adding 20 per cent. for undervaluation brings the grand total to $1,108,730.40.

The total new improvements and additions for which permits were issued during the first 10 months of the current year is placed at $7,066,999, and adding 20 per cent. for undervaluation gives a grand total of $8,480,399.80.

The question of what constitutes "current wage" for men employed by contractors on work for the city is still as unsettled as ever. City Solicitor Poe, to whom the question was referred after a vigorous protest on the part of the Federation of Labor before the Board of Awards, rules that the "current wage" which the 8-hour law makes the minimum for skilled workmen employed by contractors on city work is not as the Federation contends the minimum union wage—as $3.50 a day for carpenters, for instance—but is to be determined by striking an average of the wages actually being paid to a particular class of workmen throughout the city. In his opinion, which he has recently sent to the Mayor, he maintains that if there were out of 3000 carpenters in this city, 1500 receiving $3.50 a day and the same number receiving $3 a day, then $3.25 would constitute the "current wage" to be paid as a minimum, although carpenters could be paid more if the contractors so desired.

Chicago, Ill.

Building operations in Chicago for the year of 1909 have been going forward at an almost incredible rate. In the calendar year of 1908 all previous records were broken, even including the records established during the World's Fair construction period, but this year the total cost of construction under way, as shown by building permits issued for 10 months, is nearly $8,000,000 ahead of the 12-month total for last year, and the record for the 10 months is nearly 50 per cent. greater than the figures for the same period last year. This astonishing activity has gone on in the face of the fact that in many of the other leading cities there has been less work under way in October than was the case in the same month of 1908.

The total cost shown in the permits issued for the 10 months this year was $76,957,880, compared with $52,021,380 for 10 months last year. The record for each month last year, with the exception of August, has been exceeded this year.

Permits were issued in Chicago during October, 1909, for 986 buildings with a total frontage of 28,701 feet, to cost $7,603,400. This compares with 980 buildings in October, 1908, with 27,324 feet frontage, costing $6,242,315.

Conditions the past year have been unusually favorable. There have been no very heavy strikes to interfere with activity and the weather during October was very favorable. Work is going forward at the present time on a number of large modern steel buildings in the downtown district, and in all parts of the city new apartment houses are under construction. The low price of steel during the spring and early summer gave considerable impetus to plans for fireproof buildings, and along with this has come a new development in the use of structural steel in buildings of moderate size. The steel mills are flooded with orders for small lots of structural material for buildings of this character.

It is not expected in building trade circles that this unprecedented activity can continue much longer, and manufacturers of builders' hardware, for example, who are in close touch with architects and other reliable sources of information, express the opinion that the pace will be more moderate in the near future. The advance in prices of nearly all materials which has, in fact, resulted from this activity has already had the effect of checking new investments in improvements.

The Chicago Board of Fire Underwriters has just voted to reduce the stop rate on fireproof mercantile buildings to 20 cents, the object being to encourage superior construction. It was feared that the former stop rate of 30 cents below which a rate might not go, no matter how excellent the risk, might stand in the way of the desired result. The lower possibility is now open to theatres, warehouses, elevators, car barns, churches, &c. The stop rate on fireproof factory buildings was reduced from 25 to 20 cents, while the rate on fireproof dwellings remains unchanged at 10 cents, and on preferred other classes at 15 cents.

Cincinnati, Ohio.

The striking feature of the figures covering building operations in the city for the month of October is the large gain in the number of the permits issued as compared with October last year, while the estimated cost of the new improvements is practically the same. Last month the building department issued 782 permits for new buildings, alterations and repairs, calling for an estimated outlay of $484,965, while in October last year 523 permits were taken out for improvements calling for an outlay of $425,095.

Cleveland, Ohio

Permits issued by the Cleveland building inspector's office during the first 10 months of this year aggregate $11,411,139, which is an increase of 41 per cent., or $3,318,751 over the corresponding period of a year ago. The figures show an increase in brick buildings of 76 per cent., while frame buildings have increased only 2 per cent. The total for the 10 months shows an increase of over $1,500,000, as compared with the entire year of 1908. The number of frame buildings for which permits were taken out this year until November 1 is 2274 and their value is $3,590,576. The number of brick buildings is 635 and their cost is estimated at $6,379,575. There were 3152 permits for additions issued, making a total of 6061 permits. The total number issued during the corresponding period of last year was 5784.

A fair volume of new work continues to come out, considering the time of year, and considerable large work is in prospect for early next spring. Definite plans are already announced for the erection of one large office building next year. The City Investment Company has acquired a site on Euclid avenue in the downtown business district and will begin the erection of a 12-story building early in the spring.

The annual meeting of the Cleveland Builders' Exchange was held November 10. During the day ballots were cast for the new board of directors and 10 were chosen out of 20 candidates to serve during the ensuing year. George B. McMillan, the retiring president, at the annual banquet of the Exchange held at the Chamber of Commerce, during the evening, referred to the dynamiting of work under construction in this and other localities and said that acts of this nature had become so frequent as to warrant the undertaking by the United States and State governments, in conjunction with cities, of a systematic plan to rid the country of those responsible for the acts. "It has been suggested," he said, "that the construction companies form a league among themselves and thus unite in running down dynamiters. It is also suggested that they provide a mutual insurance fund against losses from this source. I believe these suggestions are worthy of consideration, but they do not go far enough in combatting the crime. There have been 13 attempts at this mode of destruction in our vicinity in the last two years. If allowed to proceed unchecked these cases of violence will certainly drive industries from communities in which they exist and discourage new construction to a marked degree."

The following were elected directors for the ensuing year: Ira S. Gifford, Peter Hamilton, F. G. Hogan, George B. McMillan, George A. Rutherford, J. C. Norton, J. C. Skeel, Jacob Schade, E. E. Teare and H. M. Terrell.

The following day the directors met and elected the following officers:

President, Elmer E. Teare, of Potter, Teare & Co., lumber dealers.

Vice-President, J. C. Skeel, general contractor.

Treasurer, George A. Rutherford.

Secretary, E. A. Roberts.

Assistant secretary, Chester M. Harris, the last three being re-elected.

Detroit, Mich.

Building operations in and about the city continue to show a steady increase and the record for October is of a highly gratifying character. Up to the end of the month the Department of Buildings had issued permits for 363 new structures to cost $1,206,100, and for 87 additions to cost $209,415, making a total for the month of $1,415,515. This, with the exception of October, 1906, stands as the record.

In October last year, permits were taken out for 314 new structures to cost $1,049,450, and for 62 additions to cost about $90,370, making a total of $1,139,820.

Buffalo, N. Y.

The Bureau of Building has just been moved to new quarters in the Nardin Building, at Church and Franklin streets, where it will occupy quarters in the south wing next to the Cathedral.

The report of Deputy Building Commissioner Henry Rumrill, Jr., shows that in October 310 permits were issued for buildings to cost $1,072,000, whereas in the same month last year 270 permits were issued for buildings to cost $643,-000.

Denver, Colo.

The construction of brick residences continues upon a most gratifying scale and provision is being made for the housing of a constantly increasing population. The volume of operations in October, however, was not quite up to the same month last year, although the falling off is not significant. According to the figures of Building Inspector R. Willison, there were 267 permits issued in October for new work calling for an outlay of $859,350, while in October last year the department issued 307 permits for new work costing $957,400.

Of the permits issued last month 148 were for brick residences costing $434,000, while eight were for frame residences costing $5,900. Only three apartment houses were planned, these to cost $97,000, while permits were issued for 17 business buildings involving an estimated outlay of $203,300.

For the 10 months of the current year 2883 permits were issued for building improvements to cost $10,-059,913, these figures contrasting with 2697 permits for buildings estimated to cost $8,520,720 in the first 10 months of last year.

Hartford, Conn.

Albeit the number of permits issued for building improvements in the city last month was larger than for the same month last year, yet the amount of capital involved shows a tremendous shrinkage. The figures for October this year were $430,915, while in the same month last year the valuation of the buildings for which permits were issued was $1,267,160, and in the same month in 1907 they were $1,-426,370. The shrinkage, however, in building operations as indicated by these statistics is more apparent than real for the reason that last year and the year before some exceptionally large structures were started.

Harrisburg, Pa.

The preeminent fact in connection with building operations in this city for October, is that the month breaks all previous records for a similar period in the history of the city. The figures of Building Inspector Shaffer for October makes the total for the month $442,425, whereas the previous largest monthly record for October was that of 1902, when the figures were $176,900. The biggest previous monthly record outside of the month when the permit for the State Capitol was issued, was in March, 1905, when the total was $419,160.

The figures for last month include the permit for the new technical high school, which will be four stories high and will cost $215,000. In December, 1902, a permit was issued for a $4,000,000 State Capitol, but this is not generally regarded as a city building enterprise, although the amount was counted in the total for that year.

Los Angeles, Cal.

Contrary to the expectations of builders, the total amount of new construction authorized during the month just ended, shows a further falling off as compared with the preceding months of the present year, though the October figures show a gratifying increase over the figures of last year. During the month just ended, the total value of the building permits amounted to $1,172,078 as compared with $1,375,909 for September and $1,555,199 for August. The permits for October of last year amounted to $1,020,764. As for some time past there is very little doing in the way of large construction. Only one steel frame building and this costing only $10,000 was authorized during the month. There were permits issued for 27 class C brick buildings, to cost a total of $161,080, and 57 permits for alterations to brick buildings to cost $84,626. All the rest of the permits were for frame construction, as follows: 365 one-story buildings, to cost $471,171; 25 one and one-half story buildings, to cost $63,331; 51 two-story buildings, to cost $237,217; three municipal buildings to cost $37,108; 274 frame alterations to cost $90,930, and a lot of smaller work.

Spreckles Bros. Commercial Company will erect a four-story warehouse building in the Bigelow tract to cost $78,-375, Parkinson & Bergstrom, architects, and Alta Planing Mill Company, general contractors. N. Miller will erect a $45,000 apartment house at Ninth street and Grand View, Empire Building Company, architect. Plans have now been completed for a nine-story addition to the Hotel Hayward to cost $100,000.

Montreal, Can.

Notwithstanding the fact that there was a very appreciable increase in the number of permits issued in October from the office of Inspector of Buildings Alcide Chausie, the value of the improvements showed a decided shrinkage as compared with the same month last year. The bulk of the operations consists of dwelling houses, for which there appears to be an active demand by reason of the steady growth of the city. According to the authority in question, there were 265 permits issued in October for buildings valued at $245,938, while in the same month last year 173 permits were taken out for buildings to cost $422,080.

For the 10 months of the current year the inspector's office issued 2200 permits for building improvements valued at $6,751,089, while in the corresponding months of last year 1634 permits were taken out for new work, alterations and repairs costing $4,282,178.

New Haven, Conn.

There has been a steady growth in the city's requirements for dwellings and buildings designed for business purposes as evidenced by the figures covering the improvements projected from month to month. In October 86 permits were taken out for new work to cost $253,525, as compared with 81 permits in October last year calling for an outlay of $220,460, and with 79 permits for improvements to cost $186,850 in October, 1907.

Newark, N. J.

The report of Superintendent of Buildings William P. O'Rourke shows October activity in the building line to have been in excess of that for the corresponding period last year. There were 217 permits issued by the department for new buildings, alterations and repairs estimated to cost $1,012,788, while in October last year 202 permits were taken out for improvements costing $602,121. The builders have taken advantage of the favorable weather which has prevailed to rush out of door work, and the activity is likely to continue until snow flies.

Oakland, Cal.

The building situation here shows very little change. The work authorized during the last month runs about up to the average for the year to date. It is considerably ahead of the record for September and somewhat below the record for August. During October 311 permits for buildings aggregating an estimated cost of $413,396 were issued. During September the value of the permits amounted to $367,820 and during August to $547,836. There is considerable activity in the outlying cities and towns on this side of San Francisco Bay, which, if added to the record of Oakland, would bring the total to approximately $750,000.

Philadelphia, Pa.

From statistics compiled by the Bureau of Building Inspection, it is to be noted that very few permits were issued during the month of October for buildings of any individual large size. The aggregate estimated cost of work undertaken was, however, slightly larger than that during the same month last year and showed a material gain over that for October, 1907. When compared with October, 1906, however, which holds the record for that month, a sharp falling off is to be noted.

When comparisons are based, however, on dwelling house operations, which are, to a considerable extent, taken as a guide of conditions in the building trades, the difference in the values is comparatively slight. During the past month permits were issued for 627 dwellings, of which 570 were two-story houses, at an estimated value of $1,382,650, as compared to 604 operations at an estimated cost of $1,465,-620 in October last year and 833 operations at a cost of $1,832,650 during the record month of October in 1906. October statistics show that 741 permits were issued by the bureau, covering 1253 operations at a total estimated cost of $2,892,490, an increase of $150,000 over that of the previous month and a slightly less increase over the same month in 1908. The falling off when compared to October, 1906, however, was close to $1,500,000. Notwithstanding this decline the year still promises to break all previous records for building in this city.

During the first 10 months of the present year permits have been issued for 15,103 operations, the estimated cost of which was $37,758,250, as compared to 16,081 operations, costing $36,671,850, during the same period in the record year of 1906. So far this year building operations show a net gain over those for the same period last year of $13,719,115. Authorized expenditures for workshops and manufacturing buildings during the past month totaled but $142,500. One school building was contracted for at a cost of $130,000, while permits for two tenement or flat buildings, costing $123,000, were issued.

Builders, in view of the open fall season, are considering quite a large amount of work in dwelling operations, and a number of plans covering large blocks are on the boards. In some sections of the city builders have, with the return of generally prosperous conditions, been unable to meet the demand for the smaller dwellings, and development work, particularly in the northeast section of the city, goes rapidly forward. Builders report sales of dwellings of moderate cost as moving rapidly and in a number of instances a large number of sales are recorded before houses have been fully completed. Considerable development work is going on in the suburbs, and several large tracts will be opened in the spring. Suburban building is active, particularly in dwellings of the more elaborate size.

The general demand for building materials and supplies has been particularly good, and delayed deliveries in many classes of supplies are reported. Labor is well employed and no difficulties between employers and mechanics are to be noted. The situation on the whole is very satisfactory and the trade looks forward to a continuation of prosperous conditions, although owing to the usual climatic conditions there will, no doubt, during the winter months be less activity.

One of the recent operations begun in this city is that of H. E. Hess, which includes 120 two-story houses and seven two-story stores and dwellings on Rosehill, Ontario, Tioga and "B" streets, in the northeastern section of the city. The dwellings will have frontage varying from 14 to 15 ft., dependent upon the location. The stores will have frontage varying from 15 to 18 ft. The estimated cost of the operation is about $270,000.

J. Franklin Moss, Fifty-eighth and Girard avenue, proposes erecting 37 two-story brick dwellings, and a store and dwelling, at Fifty-sixth and Lansdowne avenue.

Work was started a few weeks ago by Wm. T. Gabell on 34 two-story houses, having a frontage of 14 ft. 6 in., at Ringgold and Somerset streets.

A permit was recently granted F. C. Michaelson for the erection of 59 two-story brick dwelling houses, 15 x 38 ft., on North Eighth, Lucerne, Pike and adjacent streets. Three store buildings are included in the operation, the total cost of which will be about $91,000.

George H. Blackmire began operations recently on an operation including 23 two-story houses at Warnock and Venango, the frontage varying from 14 to 15 ft., the depth from 37 to 45 ft.

Plans have been completed by E. Allen Milton, architect, for 167 houses to be erected for O. B. Carmean at Sixty-fourth and Haverford avenue. Three stores are included in the operation.

Work was begun late in October by G. W. Young on 45 two-story houses and four two-story stores and dwellings, in the vicinity of Lambert and McKean streets.

The Board of Education of Riverton, N. J., opened bids on November 3 for a brick school building. S. W. Wakeman is president of the board.

Cope & Stewardson, architects, are engaged in the preparation of plans for a 15-story apartment house, which, it is understood, will cost somewhere in the neighborhood of a half million dollars. The plans, however, have not yet advanced far enough to enable anything definite to be said in regard to the undertaking.

Pittsburgh, Pa.

A fair degree of activity prevails in building and real estate circles, and the report of the Bureau of Building Inspection for the month of October shows that 325 permits were issued for improvements to cost $939,761, as against 296 permits for improvements costing $799,311 in October of last year. Of the permits issued last month 161 were for new buildings to cost $828,901, while 49 were for additions to cost $42,625, and 115 were for alterations to cost $68,234. Of the new buildings 38 are to be of brick, 48 frame, 66 brick veneered, three of stone and four of concrete.

Rochester, N. Y.

About the first thing to strike the casual observer in looking over the figures contained in the October report of Fire Marshall Herbert W. Pierce, is the absence of costly structures. In fact there were only three permits for buildings valued at more than $10,000, these being a shoe factory to cost $65,000, an apartment house to cost $16,000, and a power station for the Railway & Lighting Company to cost $12,000. There was a total of 312 permits issued calling for an estimated oulay of $782,334, which is an increase of $209,367 over October last year, when the total was $572,967. In October, 1907, the total was $420,435.

Already the value of the building permits issued this year exceeds by several millions of dollars the value of any corresponding period in the history of the city, and the present total is even in excess of any previous 12 months since the bureau was organized. After the first 10 months of this year the total was $7,909,628, and for the corresponding months of last year $4,210,673.

Richmond, Va.

From present indications the cost of building operations the current year will exceed by an appreciable amount the very remarkable record of a year ago, the opinion being expressed by Building Inspector Henry P. Beck that the total for 1909 will run close to $3,500,000. For October the total was $255,330 against $186,353 in October last year, and for the first 10 months of the current year the total is $2,938,687, while in the same period last year it was $2,784,977.

As a rule the cost of building and repair work is placed at a lower figure by property owners obtaining the permits than the amount actually expended when the work is carried to completion. The figures, therefore, shown by the records in the inspector's office are under rather than over the true cost of the operations.

Seattle, Wash.

As the season wanes there comes a lull in building activity, although the use of the term is relative and without important significance. The fact is that nearly 100 less permits were taken out in October this year than was the case in 1908, with a corresponding falling off in the estimated cost of the new improvements. The splendidly arranged report of Francis W. Grant, Superintendent of Buildings for this city, covering the month of October, shows 1347 permits to have been taken out, involving an estimated outlay of $1,439,125, whereas in October last year 1439 permits were issued by the department, involving improvements valued at $1,705,190. A feature of the report is found in the four permits for reinforced concrete buildings to cost $313,000 and in the five brick structures to cost $210,000. Dwelling houses still constitute an important factor in the total, permits having been issued last month for 266 frame residences, to cost $545,860, while 377 permits were issued for frame business structures, to cost $174,645.

For the 10 months of the current year the department issued 12,786 permits for building improvements, involving an estimated outlay of $16,749,235, these figures contrasting with 11,426 permits for improvements valued at $11,020,729 in the corresponding 10 months of 1908.

Among the more important buildings for which permits have just been secured were the Liberty Building on Third avenue, a three-story brick building to cost $40,000, Jesse M. Warren, architect, and Charles Williams, general contractor; the alterations to the Bank of California Building at 803 Second avenue, to cost $20,000, Beezer Bros., architects, and the P. E. Hyland three-story frame building at 1411 Bellevue avenue, to cost $14,000, George E. Maltby, architect. The general contract on the C. D. Watson Hotel at King street and Maynard avenue has been awarded to S. J. Lund for $49,000. Plans have been completed for a three-story and basement brick apartment house to be erected for George H. Parker at 1407 East Prospect street, to cost $46,000, F. A. Sexton, architect, Martin & Barth, builders.

St. Louis, Mo.

The rather heavy falling off in the permits for new brick buildings was responsible for the poor showing for October as compared with the same month last year. The aggregate of the permits issued by Building Commissioner Smith was $1,206,694, while in the same month a year ago the total value of the new work for which permits were issued was $2,280,050. As compared with September, however, the figures for last month make a little better showing, although the falling off is considerable.

Aside from new brick buildings the permits average about the same as a year ago. Additions and alterations to brick buildings decreased somewhat, both as regards the number of permits issued and the estimated cost. New frame buildings were more numerous, while additions and alterations to frame structures were somewhat less.

St. Paul, Minn.

There are no signs of a let up in building operations and ever since June the cost of the improvements projected each month have been on a gradually rising scale. Last month there were 345 permits issued for improvements, involving an estimated outlay of $1,324,400, which compares with 326 permits in September for work costing $1,036,716, while in October last year 332 permits were issued for work valued at $711,610.

For the 10 months of the current year the total value of the improvements for which permits were issued was $9,958,367, which is an increase over the first 10 months of last year of $4,129,988.

Syracuse, N. Y.

The record of building operations for October this year shows a tremendous increase as compared with October, 1908, as evidenced by the figures of Superintendent of Building J. E. Miles, when he closed his books for the month on October 30. Permits issued for new construction as well as for alterations and repairs aggregate a total of $403,795, while in October last year the total was only $242,000. The new work was made up largely of dwelling houses, for which there seems to be a steady demand by reason of the natural growth of the city.

Tacoma, Wash.

Notwithstanding the building season is practically at an end, the outlook for the spring is highly flattering; in fact, the prospects were never better. A higher class of buildings of all kinds have been and are now being erected, including business blocks, apartment houses and a good class of private dwellings. For some time past Tacoma has been averaging about 100 dwellings per month and nineteen-twentieths of them were for the owners to live in. The demand for help has been about normal and all regular carpenters have been at work. A man who could "hold his job" could get work here almost any time.

In October there were 193 permits issued for improvements, to cost $429,168, and in the same month last year 163 permits were taken out for buildings, to cost $145.899.

Uniontown, Pa.

Although somewhat early perhaps to talk about the business that is likely to develop the coming season, it now appears as if 1910 ought to be a particularly good one in this section for contractors and builders. At this time last year everything was dead, so to speak, but this fall the coke works, upon which this section is wholly dependent, have resumed operations, and over 90 per cent. of the ovens are now burning. By the first of December it is doubtful if there will be an idle oven in the region, and with this condition of affairs there is likely to be an amount of building which will keep every one well employed. It may be interesting to remark that there is a great deal of concrete and hollow block work around town, the Uniontown Construction Company doing a great deal and manufacturing their own blocks and tile.

New York City.

The absence of important office building construction in the report of Superintendent Edward S. Murphy, covering building operations in the Borough of Manhattan for the month of October is responsible for the heavy shrinkage in the total capital investment as compared with the same month a year ago. The general building situation was doubtless affected to a greater or lesser extent by the recent political campaign which had its influence on practically all lines of the building industry with the exception of high class apartment houses, private dwellings and store construction. In these classes of buildings the comparison with last year is much more favorable; some in fact showing a slight gain in the total estimated cost. The figures for October show permits to have been issued for 40 buildings involving an estimated outlay of $5,368,565, while in the same month last year permits were issued for 60 buildings to cost $13,-049,750, these totals not including the cost of building alterations in the two periods named.

The striking feature of the exhibit is the tremendous shrinkage in office building construction, there being only one permit last month for a new 14-story structure at the corner of Fifth avenue and Forty-third street, involving $330,000, as against the seven big buildings in October last year, involving an outlay of $8,691,300. Offsetting this to some extent is the activity in high-grade tenement construction, there having been 10 buildings of this class projected in October to cost $3,761,000, as against 19 in October, last year, to cost $2,985,000. There were also permits issued for six stores to cost $735,500, while in the same month last year permits were taken out for 15 stores to cost $685,500. There has also been quite a little doing in the way of private dwelling construction, five residences for which plans were filed calling for an outlay of $433,000, as compared with seven dwellings costing $105,000 in October a year ago.

Notwithstanding the loss of over seven millions in new construction work for October, the total investment for the 10 months of the present year is still far ahead of all previous records in the Borough of Manhattan, with its 3584 permits for new buildings, calling for an estimated outlay of $124,353,331, as compared with 3004 permits for new buildings costing $81,128,668 in the corresponding 10 months of 1908. There were also 234 permits for alterations and repairs costing $6,118,371 and 280 permits covering operations costing $13,696,970 in the two periods named.

In the Borough of the Bronx for October, 175 permits were issued for building improvements costing $3,678,000, and in the corresponding month last year 202 permits were taken out for improvements costing $2,313,000.

In Brooklyn permits were taken out for 783 permits involving an outlay of $4,031,250, while in the same month last year permits were issued for 1042, to cost $5,639,515. The record for the 10 months of this year, however, is considerably ahead of that of last year, the figures being $49,-130,000 and $31,382,000 respectively.

In the Borough of Queens a slight falling off has occurred in the amount of new work started during October, the value of the operations being placed at $1,024,000, as against $1,469,000 in October last year.

While brick construction work has been somewhat below the general average, there is likely to be some improvement in the near future should the weather prove favorable during the winter months.

San Francisco, Cal.

With some important exceptions, the immediate activity in the building line has drifted toward the construction of frame apartment houses, flats and dwellings, the bulk of the recent permits being for flats. This condition is recognized as the natural result of the satisfying of the more pressing demands for office and business buildings, and of the increasing demand for residences following the return of the city's old time population. The change from the erection of business buildings to dwellings and flats is shown by a comparison of the value of the contracts for frame and for brick buildings. During the first two years after the great fire the value of the brick construction ran considerably ahead of that of the frame construction from month to month. Gradually this has been reversed until during the month of October just closed the frame construction runs about one-third larger than the brick construction. The frame contracts for that month amount to $1,153,440 and the brick contracts to $848,160.

During October the total value of the building permits issued amounted to $1,969,008, as compared with $1,785,611 for the month of September, and with $3,403,897 for the month of October last year. While this shows a large drop as compared with the record of last year, it is a considerable increase over the record of the previous month of the present year. The San Francisco Architectural Club has prepared figures showing the amount of building done in this city from May 1 (just after the fire) to July 31 of the present year. This shows as follows: Eighty-six steel frame Class A buildings, valued at $20,063,260; 113 steel frame Class B buildings, valued at $8,435,871; 1477 brick Class C buildings, valued at $45,510,641; 13,444 frame buildings, valued at $55,487,512; 7198 alterations, valued at $10,087,-254; total, $139,584,538.

The Advisory Committee, which is recommending amendments to the San Francisco building law, has incorporated in the amendments which it will recommend a provision for increasing the hight of Class C buildings (brick or concrete structures with a frame skeleton) from 75 to 84 ft.

City Architect L. P. Rixford has compiled a statement showing what the municipality has done in the way of building since the great fire of three and one-half years ago. During that time the city has completed 11 new schoolhouses at a cost of $763,500; seven other schoolhouses will be completed before the end of the present year, at a cost of $779,500; seven others have been contracted for and will be completed by April 1, 1910, at a cost of $1,003,500; contracts for the construction of four others at a cost of about $55,000 will be let within the next few weeks; and plans are under way for the construction of several additional schools to cost approximately $1,465,000.

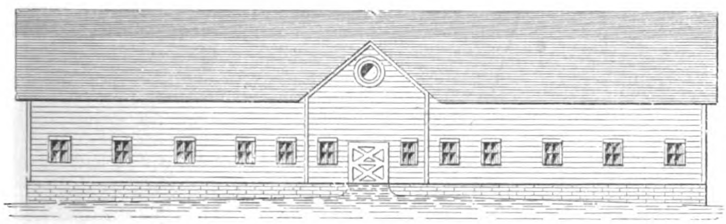
Work on the San Francisco Hospital, to provide for 900 patients and to cost about $2,000,000, is well under way. The hospital will include eight steel frame Class A buildings and a number of others. All of the foundations are in place, most of the steel has been shipped and the contracts for the fireproofing will be let in December. The steel work of the Hall of Justice and the County Jail is now in place and the final contracts will soon be let.

For the Fire Department eight fire engine houses have been completed at a cost of $153,246; work is nearing completion on the Fire Department corporation yard and on three more fire engine houses, to cost $156,455; a building for the Central Fire Alarm Station has been completed at a cost of $15,000; plans have been completed for another engine house to cost $28,000, and plans will be completed for another to cost $23,000 within the next few weeks. Beside the frame buildings put up for the Police Department immediately after the fire, plans are now ready for bids on two new police stations, to cost about $75,000. A group of reinforced concrete buildings to cost $292,000 and capable of caring for 300 patients are under way on the Alms House Tract. These will be completed by February 1. About $100,000 has been spent for temporary frame buildings for school and hospital purposes.

A Horse Barn at West Jefferson, Ohio.

The plan and elevation which we present herewith relate to a horse barn designed especially for breeding purposes, but is of such a nature that it would be an economical barn for general purposes. The main structure is 44 ft. wide and 132 ft. long, with a wing 20 x 24 ft. in area. It is 16 ft. to the square, and has a curb roof, which will admit of the stable being 9 ft. in the clear, and still provide for an abundance of storage room in the loft above for hay and straw.

An inspection of the floor plan shows that there is a feed alley each side of the building 4 ft. wide, thus permitting of the feeding of all the horses without the necessity of going into the stalls. This is an important feature of safety, especially where stallions are kept, and the trainer cannot always be present at the hour of feeding. Each box stall is 12 x 14 ft. in size, with doors opening inward, which is another feature of safety with horses. A long passage extending through the center of the barn admits of giving the horses exercise in the most severe weather without the necessity of exposure to the elements.

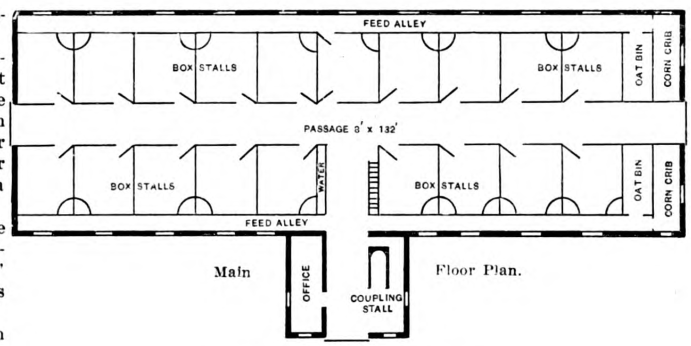


Front Elevation.

An oat bin and grain crib are located on each side of the building at the end to facilitate the feeding of the horses, while above these are bran bins, the bran reaching the lower floor through spouts. A convenient water tank is also provided, and there is a stairway leading to the loft.

The foundations of the building are of concrete, while the frame is constructed on the "Shawver System." A few of the stalls are fitted up as double ones for emergency calls.

The wing contains a room for an office and harness room, and is also fitted with a coupling stall, which avoids the dangerous teasing pole yet in use on many breeding farms.



Main Floor Plan.

A House Barn at West Jefferson, Ohio.

A living or sleeping room for the horsemen is provided on the second floor over the office.

The barn here described was erected for James E. Spencer, at West Jefferson, Ohio, where Mr. Spencer has 500 acres of land.

Zinc Metal Shingle Nails.

Zinc shingle nails are the latest use to which metallic zinc has been put, the nails being the product of one of the zinc smelters operating in the Illinois smelting field, says the *Improvement Bulletin*. The nails are cut and are solid zinc, which is quite a contrast to the ordinary galvanized nails which have been on the market for a long time.

The nails are indestructible as far as rusting out is concerned, and a roof put on with them will last forever if it is made up of zinc shingles or slate unless the house should be destroyed by fire. Weather will not affect the nails in the least as far as corrosion is concerned, and the only wear upon the nails comes in the contraction and expansion accompanying changes in temperature. This makes permanency of roofs as nearly perfect as can be expected.

The relative cost of nails as compared with iron is almost three to one per pound, but the larger number of nails in a pound of the zinc nails largely diminishes this ratio. At present the cost of iron nails is 5 cents, while the zinc nails is 14 cents per pound, retail. The actual ratio of cost is perhaps closer to two and a half times than three times, at these prices, considering the relative number of nails to the pound of each metal. Iron nails last about six years, while the zinc nails last forever. Even when the roof is made of wood shingles and they rot out, necessitating new shingles, if they were put on with zinc shingle nails the nails may be used over again, while iron nails would be utterly useless.

Galvanized shingle nails have been used for a number of years, but the main difficulty in the use of such nails lies in the preservation of the zinc coating without any breaking whatever. If through driving and bending the zinc coating is broken exposing the iron, galvanic action is set up at once and the destruction of the nail is only hastened. It is therefore apparent that the solid zinc nail will find a permanent place in building, especially in the putting on of roofs and outside coverings where nails are exposed to the destructive action of air and water which so quickly oxidizes iron metals.

Some Large Iron Girders.

In connection with the construction of a new theater in the city of Toronto, Canada, some girders of rather unusual size are being used. Both the balconies and gallery are carried on plate girders spanning the full width of the building, thus leaving the auditorium free from columns. The girders are each 77 ft. 2 in. in length, 4 ft. 6 in. deep and each weighs 48,000 lb. The roof trusses are 90 ft. long and weigh 20 tons each, and are designed to carry the weight of the fly galleries and all the hanging scenery in addition to the roof loads. The architects of the new theater building are L. H. Lempart & Son, Rochester, N. Y.

Wooden vs. Steel "Forms" in Concrete Construction.

The great advantage of wood for form work in concrete construction is that it is readily fabricated in the field, while at the same time it is usually readily available. Steel is markedly inferior in both these respects; otherwise it is generally equal or superior to wood for the purpose named, says a writer in *Engineering-Contracting*. The quality in which steel is most superior to wood is durability. To develop steel successfully in competition with wood for form work its superior durability must be utilized to the fullest measure.

A number of engineers have been and are now working on the problem of steel forms. Examples of their labors are given by the steel wall forms recently put on the market. These wall forms are comparatively simple applications of steel to form work; the success of the application lies in the fact that unit construction is practicable and the same units can be employed over and over. In a word, the durability of the steel is utilized. A more familiar example of steel form work is the steel center now so commonly used for concrete sewer and aqueduct construction. Here again the properties of unit construction and of repeated use of the units are exemplified. A still better illustration of the point being made is furnished by the concrete block machine and the various steel molds for ornamental shapes, pipes, posts, &c.; here the form becomes a mold for repeated use.

In general, it may be asserted that wherever steel has come to be commonly used for forms it has been for work where unit construction and repeated reuse of the units are possible. It is probably safe to go even further and assert that under no other circumstances will steel obtain a successful place compared with wood as a material for form work. To our mind the inventor has his problem stated in these two assertions. It is to apply unit form construction to all classes of concrete work. To what extent is it likely that this can be done?

As noted above, several steel forms for wall work have been worked out. Steel forms for conduits, as has also been stated, are commonly and successfully in use. Steel vault forms for telephone conduit work have also been most successfully used in the same city. For plain walls, conduits, for tunnel lining, culverts and small arches generally, and for manholes and vault work in which standard sizes are possible, steel forms have, it seems to us, an immediate field of economic use. The same statement is, we believe, true of tank and bin work.

As buildings in reinforced concrete are now designed, about the only places that steel forms appear possible are wall construction, column construction and centers for floor slabs. One prominent engineering firm in the West has used slab center sheets of corrugated iron in place of planks. Continued use of steel in place of wood in these places by this firm would seem to argue the reasonable success, if not the advantage, of metal. If steel forms are to become generally used in building work, it would seem essential to adopt in designing standard construction units, that is, standard column spacing, wall and floor panel widths, &c. The possibilities in this direction are considerable, and we believe that they will be utilized as time goes on, and that when this is done the steel form will present a strong claim for a place in building work.

The Lighting of the Metropolitan Tower.

The tower of the Metropolitan Life Insurance Building, facing Madison Square Park in New York City and which is the highest building in the world, is lighted by special reflectors which produce effects that are decidedly striking and unique, and which can be seen at night for miles in all directions. The lantern at the extreme top is more than 7 ft. in diameter and when lighted has the appearance of one mass of fire. It indicates the hours by flashes of white light, while red flashes indicate the quarter hours—one flash for quarter past the hour, two flashes for half past the hour and three flashes for three-quarters past the hour. The special reflectors were furnished and installed by the firm of I. P. Frink, 551 Pearl street, New York City.

AN apartment house which will provide accommodation for 48 families and will cost in the neighborhood of a million and a half dollars is soon to be erected at the northwest corner of Broadway and 113th street, Borough of Manhattan, New York. It will be a 12-story, high-class apartment house covering a plot 125 x 175 ft. in area. The architects are George and Edward Blum. Another 12-story elevator apartment house measuring 100 x 106½ ft. and to cost in the neighborhood of $600,000 is to be erected at the corner of Park avenue and Seventy-sixth street, New York City, in accordance with plans prepared by Pickering & Walker.

New Publications.

Concrete Pottery and Garden Furniture.—By Ralph C. Davidson. 196 pages, 5¼ x 7½ in. in size; 140 illustrations. Bound in cloth. Published by Munn & Co., Inc. Price, $1.50, postpaid.

Among the many uses for which concrete appears to be well adapted is in making pottery and garden furniture, and the above work, which is the only treatise of the kind so far as we are aware, will obviously appeal to those interested in ornamental concrete. The amateur craftsman who has been working in clay will especially appreciate the adaptability of concrete for pottery work inasmuch as it is a cold process throughout, thus doing away with the necessity of kiln firing, which is imperative with the former material.

An excellent idea of the broad scope of the work may be gained from the titles of the 13 chapters into which the subject matter is divided. The first two chapters explain a rather unique and original method of working pottery which has been developed by the author. They deal with the making and covering of wire forms and modeling the cement mortar into form. In chapter 3 the author deals with plaster molds for simple forms, after which he takes up plaster molds for objects having curved outlines. In chapter 5 the making of an Egyptian vase is described, which involves a combination of casting and modeling. Next in order are glue molds, colored cements and methods used for producing designs with them; selection of aggregates, wooden molds, concrete pedestals, benches and fences, while the concluding chapter takes up miscellaneous matters, including tools, waterproofing and reinforcing.

Undoubtedly one of the most interesting and valuable chapters is that on color work, concerning which comparatively little has been written, but for which class of work there is a constantly growing demand. The author has taken it for granted that the reader knows nothing whatever about the material and has explained each progressive step in the various operations throughout in detail. These directions have been supplemented by half-tone and line engravings, which are so clear as to practically tell their own story.

Bricklaying System.—By Frank B. Gilbreth. 320 pages, 6 x 9 in. in size; 167 illustrations and 73 charts showing brick bonding. Bound in cloth. Published by Myron C. Clark Publishing Company. Price, $3, net.

Although this work illustrates and describes many special appliances and methods developed by the author in his extended experience as a contractor for the purpose of facilitating the laying of brick, yet the volume constitutes a most valuable contribution to the literature of the subject and cannot fail to be welcomed by the brick mason and contractor, as well as by the architect and engineer. The subject matter is comprised in 18 chapters, in the course of which the author touches upon practically every phase of modern bricklaying. The purposes of the book are stated in the preface to be as follows:

(a) To put in writing that knowledge which has been handed down by word of mouth from journeyman to apprentice for generations.

(b) To record methods of handling labor, materials and plant on brickwork that will reduce costs and at the same time enable the first-class workman to receive higher pay.

(c) To enable an apprentice to work intelligently from his first day, and to become a proficient workman in the shortest possible time.

What the author has to say regarding the training of apprentices is of especial interest at this time when so much discussion is appearing in the trade press concerning the need of competent mechanics in the various branches of the building industry.

In the chapters which follow many appliances devised by the author, together with apparatus designed for the rapid and efficient handling of brick, are illustrated and described in a way to command attention.

while an extended chapter on brick bond illustrated by 73 charts constitutes a most valuable contribution to the literature dealing with this phase of the bricklayer's work. The volume concludes with a glossary of terms used in bricklaying and an index alphabetically arranged.

Sanitation and Sanitary Engineering. By Wm. Paul Gerhard, C. E. 176 pages. Size, 5 x 7½ in. Bound in board covers. Published by the author. Price, $1.50, postpaid.

The matter contained within the covers of this work is embraced in six parts or chapters, the author covering the subjects indicated in a way to appeal not alone to the sanitary engineer, but to all who are concerned in the health and comfort of the public at large. The book is convincing with regard to the broad scope of sanitary engineering, and it is not surprising to find the author in more than one place taking exception to the appropriation of the term "sanitary engineer" by a man who is qualified only in a single special branch, such as house drainage.

In that portion of the work dealing with sanitary engineering and its practice there are presented some pertinent truths regarding the water supply of cities and dwellings, sewage disposal, street cleaning, garbage disposal, &c., together with the qualifications and duties of the sanitary engineer. It is pointed out what service the sanitary engineer should perform or be able to render in the cause of humanity in time of epidemic, of war and in sudden calamities in civic life.

The author pays a high tribute to the late Colonel Waring, asserting that no American engineer has done more than he for the cause of public sanitation. He is optimistic with respect to the place that sanitation will hold at least in the early future, and predicts that in the coming century the memory of school children will not be taxed with dates of ancient wars so much as with dates from the history of civilization of discoveries and inventions and of the progress of civil engineering.

In the third section of the work the author deals with a half century of sanitation, covering the period from 1850 to 1900. Probably the most interesting chapter is that relating to sanitation in Greater New York, in connection with which some very valuable statistics and data are presented. Sanitation in Russia and reference to other works of the author dealing more in detail with problems in sanitary engineering conclude the volume.

Brief History of Cements. By I. C. Johnson, Gravesend, England. 28 pages. Size, 6 x 9¼ in. Illustrated. Bound in paper covers. Published by the Cement Record Company. Price, 50 cents, postpaid.

This pamphlet has been prepared with a view to establishing the real inventor of Portland cement, describing how it was invented, developed, manufactured and the machinery employed for the purpose. The author describes in detail how the first successful product was received on the market, what were the objections and difficulties that the introduction of it met with, what were the first applications and other interesting particulars. The early pages are devoted to a biography of Mr. Johnson, who claims to be the inventor and pioneer of the Portland cement industry, although he states that he does not pretend to be the inventor of hydraulic cements, but only of Portland cement as perfected and made to pass the many severe tests of exacting engineers for use in the construction of harbors, docks, foundations of bridges and all other work where water resistance is required. This is said to be the first time that the true facts regarding the invention of Portland cement have ever appeared in print.

THERE has recently been completed on Madison avenue, this city, a non-housekeeping apartment building which is in many respects unique, for while it has all the conveniences of a first-class hotel, it is planned on the lines of a home club. There are no light courts in the building and all living and sleeping rooms have outside exposure. Special attention has been given to heating and ventilating the premises, and the plumbing and lighting fixtures are of the most modern type. The building is five stories in hight, with a tower rising several stories above the central facade. On the fifth floor of the main building is a handsome dining room, while studio apartments have been arranged in the tower.

Tapestry Brickwork.

To one who remembers the dreary brick walls that formed so prominent a feature of the brick architecture of the United States of 20 years ago, it is both interesting and instructive to read the essay, "Artistic Brickwork; Its Achievements and Possibilities," by Claude Bragdon, which forms the leading chapter in an unusually attractive book entitled "Tapestry Brickwork," issued by Fiske & Co., Inc., of Boston and New York. Mr. Bragdon's article is of great service in pointing out just what position brick has held as a building material all through the past ages and in emphasizing the fact that in the hands of a real artist it is capable of producing the most charming effects that fall within the scope of the architect.

Up to a few years ago there was nothing worthy of the name of brick architecture in the United States excepting, perhaps, the architecture of the Colonial period, which was an echo of the architecture of the Georgian period in England.

The brickmaker's ideal in the past has been a brick of a single size and shape, a surface of the proverbial Yankee "slickness," and a color like a firecracker. And the ideal of the bricklayer has been to arrange these uninteresting units in a uniformly monotonous manner, concealing the headers by clipping and suppressing the joints as much as was humanly possible. The aim seemed to be to produce a brick wall that should be as smooth as a billiard ball and as interesting as a piece of tin painted a dull uniform red.

America is rapidly awakening, however, to the realization that such an ideal is absolutely devoid of true art. Such great architects as H. H. Richardson, Charles F. McKim and Stanford White laid their transforming touch upon the brickwork of their day, and have made it blossom forth with all the beauty, grace and interest of the medieval masterpieces. The more artistic of our people have awakened to the wonderful possibilities which have so long lain dormant in our brickwork, and a genuine revival of craftsmanship in brickwork is under way.

J. Parker B. Fiske, S. B., the editor of the book, has supplemented Mr. Bragdon's paper by some interesting and valuable chapters entitled, respectively, "Tapestry Brick," "The Cost and Advantages of Using Brick," and "Bonds and Mortar Joints." The publishers have performed a true service to both the architect and the layman in the data which they furnish in the chapter entitled "The Cost and Advantages of Using Brick." To the prospective builder the question of comparative cost of frame, brick or concrete construction is sure to present itself, and there has been little or no data in accurate or convenient form for reference until the publication of this book.

In the closing chapter, entitled "Bonds and Mortar Joints; Their Influence on Brickwork," the various methods of assembling the brick in the wall and the best size and finish of mortar joints, all to bring out the highest degree of latent potentialities in brick construction, is clearly set forth with diagrams and photographs, and will be of great assistance to designers of brickwork.

Handbook for Architects and Builders.

There has just been issued under the auspices of the Chicago Architects' Business Association a volume of 352 pages, substantially bound in board covers and entitled a "Handbook for Architects and Builders." It is without doubt the best edition of this work which the association has ever issued, and the matter contained within its covers is of such a nature as to render it a valuable adjunct to the trade literature of every architect and contracting builder, not only in the State of Illinois but throughout the United States.

Since the handbook was first issued 12 years ago a vast amount of new matter has been added, bringing it thoroughly up to date, the 1909 edition containing many new tables of useful data, and there is also published for the first time the new schedule of charges and code of practice of the Chicago Architects' Business Association, as well as a new article by Professor N. Clifford Ricker on "Base Plates for Columns." An addition to the list of contributors has also been made in the name of Benjamin E. Winslow, a consulting civil engineer, who will edit matters pertaining to structural design, while Homer R. Linn, a consulting mechanical engineer, continues to edit all matter pertaining to heating and ventilation. The main features of the work in addition to those enumerated include the revision of the building ordinances of the city of Chicago up to date; standard rules of the measurement of plastering as adopted by the Employing Plasterers' Association of Chicago; Roofing and Roofing Material by L. P. Sibley, secretary-treasurer of the National Association Master Composition Roofers of the United States; "Extracts from Void's Settlement and Weight of Crushed Stone," by Ira O. Baker, professor of civil engineer, University of Illinois; "Artificial Illumination," by T. H. Amrine; "Suggestions for the Provision of Wiring and Cabling of Buildings for Telephone Service"; some interesting "Points on Varnish," also "Wood Finishing"; "Time, An Important Factor in Painting," by P. W. Nelson, late professor of the Royal Polytechnicum, Stockholm, Sweden; "Frame and Boxed Construction Carpentry, Structural and Ornamental Iron," by Emery S. Hall, giving estimates for ordinary joist and steel construction, with tables and examples, also details of ordinary door and partition work; estimates on painting; methods of figuring various kinds of contract work, &c., &c. Not the least interesting chapter of this work is one on the "Orders of Architecture and Their Applications," by Alfred W. S. Cross and Alan E. Munby. There is also much useful miscellaneous information concerning building engineering and materials likely to be of assistance to architects in the preparation of plans, specifications, estimates and the general supervision of the construction work. A list of licensed architects in the State of Illinois, alphabetically arranged; a list of officers and members of the Chicago Architectural Club; a list of members of the Illinois Chapter of the American Institute of Architects and of the Municipal Art League of Chicago are features o fthe book. Owing to the fact that the City Council had not passed the building ordinances under consideration up to the time of going to press the handbook does not contain these new ordinances, but all amendments up to and inclusive of July 6, 1909, are presented.

Building Contractors' and Materialmen's Association.

The Building Contractors and Materialmen's Association, with headquarters at 220 Broadway, New York City, has just been organized for the purpose of protecting themselves against speculators who make a business of purchasing large tracts of land without paying down much if any cash and then constructing rows of houses The new association contemplates putting an end to this sort of thing by issuing reports in connection with all specifications filed for the erection of houses showing who the owners are, from whom they are purchased, or if the parties to the transaction are incorporated, who the incorporators are; the amount of capital stock; what mortgages are on the property, together with the terms of the mortgage and a list of all liens and incumbrances. An officer of the Association pointed out that the most annoying feature about the manipulation of the speculators had been the impossibility to convict them of crime. They form corporations and whatever is done is chargeable to the corporation. They buy the land in the name of the corporation, often not paying a single dollar, and then raise all the money they want from some building association. One of these dummy corporations recently filed specifications for nearly two hundred houses to be put up on land purchased in this way.

It has been an easy matter for coroporations of this kind to get all the material and contracting work they desire for the mere asking, but when it comes to paying, it has always been found that there was not only no money, but that the equity in the property was held by a dummy mortgage, and that the only person to gain by the operation was the man who got up the corporation and hid behind it.

THE jury which has just completed its investigation into the collapse of the new building at Milwaukee and Sawyer avenues, Chicago, Ill., on September 17, in which four men lost their lives and many other were painfully injured, has decided that the plans of the architect and the construction of the building were faulty and that the Building Department was careless in approving these plans.

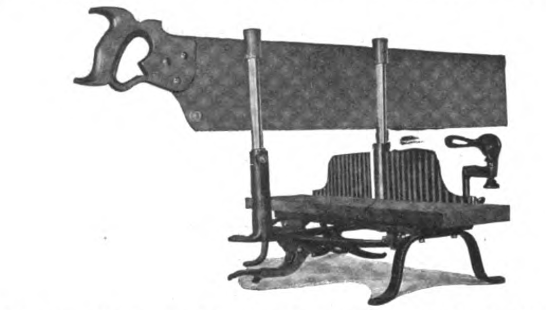
JERRY HURLEY, St. Louis, Mo., was elected president of the International Brotherhood of Composition Roofers at the present meeting in Cincinnati; Peter O'Brien of New York was elected first vice-president; William Fox, St. Louis, second vice-president, and D. J. Ganley, New York City, general secretary and treasurer.

CONTENTS.

NOVELTIES.

The True Miter Box.

A new miter box just placed on the market by the Nicholls Mfg. Company, Ottumwa, Iowa, is here illustrated. The features of the tool to which attention is especially directed are the high lift of the saw and the ease of its adjustability at different hights. In Fig. 1 the saw is shown raised to full hight. The saw guides telescope in cast iron sleeves, in which they are held in the position shown by a spring brake so adjusted as to require but a light tap on the guides to lower the saw onto the work. This movement is also controlled by a small lever at the foot of the front guide sleeve. The box is made of cast iron, malleable iron and steel, the side and bed plates being cast in one piece. A swinging bar carrying



Novelties.—Fig. 1.—The True Miter Box with Saw Raised Full Hight.

the front sleeve post moves over a graduated scale marking the angle degrees. A birchwood bottom, ¾ x 5 x 24 in. is provided for the box, and may be easily replaced when worn out. The miter box is made in three sizes, A, B and C, which accommodate, respectively, saws 4 x 26, 4 x 28 and 5 x 28 in., with a capacity for cutting 9-in. right angles and 6-in. 45-degree miters. All parts of the tool are represented as accurate, being machined, and all holes jig drilled, thus insuring a fit of every part, which can be replaced when required.

Large Sheet Metal and Copper Contracts.

The Perritt Iron & Roofing Company, Susquehanna street and Brushton avenue, Pittsburgh, Pa., has recently secured a contract for all the sheet metal and copper work for the new plant being built by the Brooklyn Cooperage Company, at Chalmette, near New Orleans, La. The plant in question includes a four-story warehouse building, 100 x 250 ft. in area, and a one-story manufacturing building, 150 x 300 ft. in plan, which will require: Eighty-eight automatic tin clad fire doors, with 8 x 8 ft. openings; 22 sheet metal frames and sashes, 6 x 11 ft.; 10 sheet metal transoms, 8 x 10 ft.; 400 squares of No. 22 corrugated galvanized iron for the warehouse building; besides all the copper work required for copper gutter, down spouts, flashing, &c. Other orders recently secured by the company, include: Thirty thousand square feet of double glazed skylight, fireproof windows, doors and miscellaneous copper work for a new 200 x 200 ft. building being erected by the Duplan Silk Company, Hazelton, Pa. The roofing and copper work for the new power house, and all of the copper work for covering the steel bridges connecting the old to the new buildings of the S. S. Hospital, Pittsburgh, are also being erected by the concern. This is the second contract covering work for this hospital.

New Design of Sheet Metal Ceiling

A new centerpiece of Italian Renaissance style for metal ceiling work has been added to the variety of designs obtainable in the metal ceiling plates of the Eller Mfg. Company, Canton, Ohio. Observers of the sheet metal industry cannot fail to appreciate the growing importance of architectural sheet metal work for interior as well as exterior embellishment of buildings. The opportunity has been taken several times in this journal to emphasize the possibilities of sheet metal work in connection with building construction, residence interiors being now as acceptably treated by decorative effects in sheet metal as the business and public types of building. Some of the features which have been giving this phase of the sheet metal industry such popularity, though, perhaps, needing no enumeration, include the possibility of treating all parts of an interior, the ceiling, the coves, the walls, the wainscoting, and the like, with the metal and that such interior finish is both

Fig. 2.—New Design of Sheet Metal Ceiling.

fire and water resisting, tending to bring about a low rate of insurance and minimizing the chances for the building to become more or less of a storehouse of moisture where dampness is likely to be disagreeable or even dangerous great in amount. The accompanying illustration, Fig. 2, of a single design does not of course give any idea of the scope of decorative effect possible, this being obtainable only through the generously illustrated catalogues which companies like the Eller Company publish for distribution among the trade.

The Hildreth Floor Scraper.

In Fig. 3 of the accompanying illustrations we present a general view of a floor scraper which is being introduced to the attention of the trade by L. M. Hildreth, 514 Elm street,

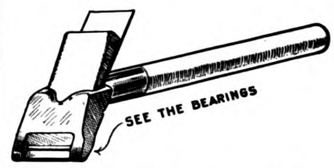
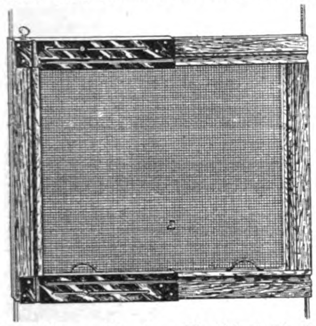


Fig. 3.—The Hildreth Floor Scraper.

New Haven, Conn., and which is said to represent the results of 20 years' experience in such work as the finishing of hardwood floors, decks and other surfaces requiring to be scraped and smoothed. It is known as the Hildreth scraper, which it is claimed "cuts like a plane and never chatters or jumps." The construction is such that the bearings limit the depth of the cut, thus rendering it impossible to gouge into the work, while at the same time it allows the entire tool to be regulated to any angle without the use of loose joints or swivels. This improved set the company claims "to be the only improvement in scrapers since the open blade was first used. Others have improved the method of holding the scraper blade, but none the 'business end,' or cut of the tool." The scraper was patented on June 30 of the current year, and is intended for use on hard or soft wood. It is of such a nature as to appeal to carpenters, builders and woodworkers generally. The scraper weighs only 20 oz., and is sent out packed in a neat box. A scraper can be obtained at almost any hardware store in the United States for 85 cents or that amount in 2 cent postage stamps can be sent to the manufacturer.

Worthington's Improved Adjustable Lift Screen.

The Worthington Roller Screen Company, 114 East Baltimore street, Baltimore, Md., has just brought out an improved adjustable lift screen, a general idea of the appearance of which may be gained from an inspection of Fig. 4 of the engravings. The screen is referred to as a made-to-order article, and it is pointed out that for the first time it is possible for the dealer to carry such a screen in stock and be able to hand out to his customer an attractive made-to-order screen on the spot, which will fit any window and is adjustable for 6 in. The tongue is also referred to as a new and valuable improvement, as it is made of a specially designed metal overcoming the great objections of the screen sticking, swelling and becoming hard to raise or lower in damp weather, which has always been the case with the old wooden tongue or rack. The claim is made that the adjustment of this screen is so arranged that it is invisible, a feature which cannot fail to be appreciated by the trade.



Novelties. — Fig. 4. — Worthington's Improved Adjustable Lift Screen.

Sash Operating Apparatus.

A most interesting catalogue of 48 pages in which attention is called to apparatus for opening and closing hinged and pivoted sash, and which is pointed out as being the outgrowth of over 40 years' experience, has just been issued by the L`rd & Burnham Company, Irvington-o. Hudson, N. Y. The publication is known as "Catalogue No. 6," and embodies within its covers a great deal of valuable information bearing upon the subject indicated by the title. During the period named above the apparatus has been constantly improved and the number of the different types of its parts increased so that now the company claims to be fully prepared to furnish a device which will meet every conceivable condition in the operation of ventilating sash of modern factories, power houses, public buildings, car barns, foundries and manufacturing plants of all descriptions. The headquarters of this sash operating apparatus is at the company's factory at Irvington-on-Hudson, N. Y., where are concentrated the engineering, drafting, manufacturing and sales departments. The company points out that it is therefore able to submit close estimates and accurate layouts quickly, also to make prompt deliveries of the apparatus. In the catalogue under review is fully described the details of the company's standard apparatus, so that with the aid of the cuts and the dimensions given prospective purchasers will often be able to order by number the parts they require. The company is also prepared to design and make special apparatus to meet exceptional conditions. The illustrations are in many instances halftone engravings showing buildings and interiors in connection with which the company's sash operating apparatus has been installed. The entire make-up is such as to render the catalogue of special interest and value to architects, builders, contractors and engineers.

Stanley's Screen Door Hardware.

The Stanley Works, New Britain, Conn., and 79 Chambers street, New York City, has just put on the market two new sets of screen door hardware, as here illustrated. Fig. 5 shows set No. 1750, consisting of one pair of ornamental wrought steel loose pin butts, 3 x 3, to screw on the surface; one wrought steel pull, 5 in. long; one wire spring, and one gate hook and eye. The spring is a No. 3 and of high grade, carefully tested. Fig. 6, set No. 1752, is somewhat lower in price than the No. 1750 and consists of one pair ornamental wrought steel loose pin butts, 2½ x 2½ in.; one wrought steel pull, 3½ in. long; one wire spring, No. 2, and one gate hook and eye. Both sets are Japan finished, packed complete with screws to match in a neat pasteboard box, and 12 sets in a carton. For higher grades of screen work the goods can be supplied in antique copper or brass finishes at a slight advance in price. Doors may be removed at the end of the season by simply removing the butt pin and the disconnecting spring.

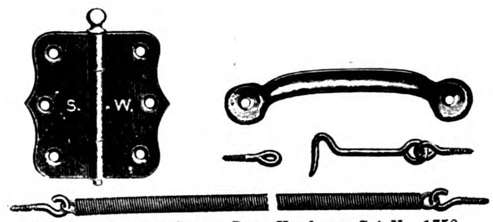


Fig. 5.—Stanley's Screen Door Hardware Set No. 1750.

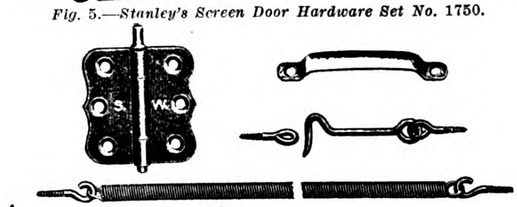


Fig. 6.—Stanley's Set No. 1752.

The New Crescent Wood Planer.

An important feature of the 18 and 24 in. wood planers made by the Crescent Machine Company, Leetonia, Ohio, and shown in Fig. 7 of the accompanying illustrations, is that the frame is cast in one piece, which it is claimed insures a steady running machine and makes it impossible for it to be racked out of alignment. The bed does not slide on ways inside the frame, but is gibbed direct to the body of the frame. This construction is rigid, accessible for adjustment and not liable to clip the ends of the lumber. The head is milled from a solid bar of steel and is carefully balanced. It is suited for two knives and is driven by a flanged pulley which is securely keyed on. The chip breaker and pressure bar are placed as close to the head as clearance will allow, so that extremely short stock may be worked. The bearings for the head are simple, and permanent alignment is insured by having their lower parts cast solid with the frame. They are lined with high speed Babbitt. To adjust for wear liners are provided, and self-closing oil covers to exclude dust. An oil chamber and capillary felts make the bearings practically self-oiling. Wherever possible the other bearings throughout the machine have self-closing oil covers. A belt from the countershaft to a pair of tight and loose pulleys on the machine drives the feed, and a convenient belt shifter provides for starting and stopping the feed. Regularly the machine has a feed of 25 ft. per minute, but a larger pulley to give a feed of 30 ft. per minute may be had. All the rolls are made of steel. The upper rolls only are driven; the infeeding roll is corrugated. A graduated brass scale shows accurately the thickness of stock being surfaced. One revolution of the hand wheel will raise the table ⅛ in. The machine may be belted in any direction to a countershaft, above or below, to front or rear. The countershaft has drip cups, shifter fingers and a connection for a lever. The equipment furnished with each machine includes a coun-

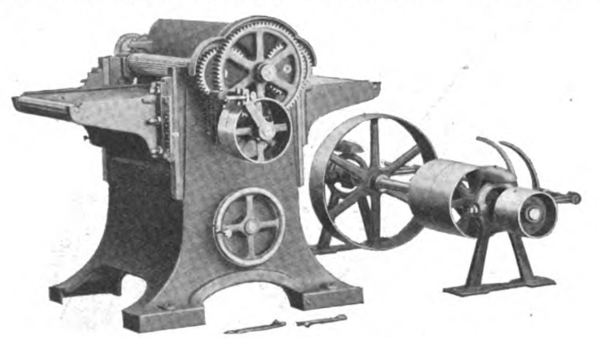
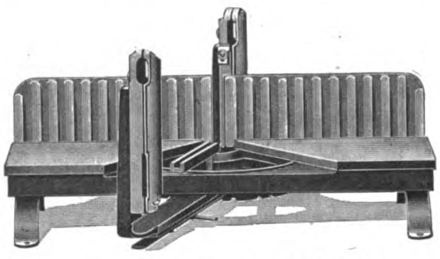


Fig. 7.—New Wood Planer with Countershaft.

tershaft, pair of knives and two wrenches. The machine is made in two sizes, 18 and 24 in. The width and thickness the 18-in. size will plane is 17¾ x 6 in., and the 24-in. size, 23¾ x 6 in. The floor space, exclusive of the countershaft, required by the smaller size is 44 x 45 in. and for the larger 45 x 50 in. The weights are respectively 1200 and 1400 lb.

The Greenfield Miter Box.

The Goodell Mfg. Company, Greenfield, Mass., has just placed on the market a new miter box known as the "Greenfield," a general view of which is presented in Fig. 8 of the engravings. This important adjunct to the carpenter's kit of tools has been brought out in order to meet the demand for a strong and accurate miter box at a reasonable price. It has a single piece iron bed and back, steel legs and emery boards to keep the work from slipping. The saw guides are quickly adjustable to any thickness of back or panel saw, and when using the former stops are provided to saw any depth. Rawhide is in the gib to prevent a panel saw striking metal. Provision is made for taking up any wear of the saw guides by adjustment of the screws on the inside of the posts. Besides automatically locking at all the regular angles by simply turning a lever, it can be instantly set and locked at any angle.



Novelties.—Fig. 8.—The Greenfield Miter Box.

The Star Floor Scraper.

One of the latest candidates for popular favor in the way of a floor scraper is the device which has been placed upon the market by the Star Scraper Company, Elkhart, Ind., and which is illustrated in general view minus a portion of the handle in Fig. 9 of the engravings. The point is made that by means of the ball and socket connection between the blade and carrying head the blade can be set diagonally across the flooring to any angle desired. Having a shearing cut it operates smoothly over butt joints and removes all the planer marks and any little irregularities so as to give a perfectly smooth finish. The claim is made that with this scraper one man can do as much work in a day as four men can by hand, and at the same time do it better and easier. It works equally well on old or new floors, and always has enough weight on the wheels to guide it, so that there is no trouble experienced by it sheering to one side. In operating the scraper the company suggests that the cutting blade first be set diagonally across the floor to a right or left angle and then run quickly over the floor and level down. After the floor has been leveled down, reverse the angle of the cutting blade and finish the work. The scraper weighs 80 lb., and is claimed to be properly balanced to give the most satisfactory results in operation.

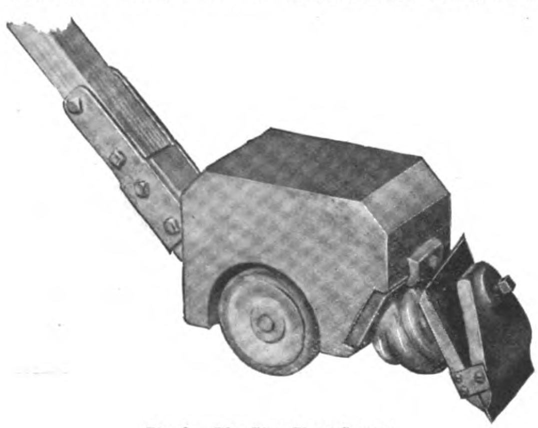


Fig. 9.—The Star Floor Scraper.

White, Van Glahn & Co.

In view of the demands incident to the rapid growth of their business, the old established firm of White, Van Glahn & Co. has been incorporated under the laws of the State of New York. This concern which, with its predecessors, has been in the builders' hardware business since 1816, is one of the best known houses in the city, its main place of business being at 37 Barclay street, in a large new building, which is fitted up with every modern convenience. The old stand at Chatham square, where the business commenced nearly a century ago, is still maintained, and it has a thriving trade. Edward C. Van Glahn, the president of the new corporation, has been the managing partner of the house for 20 years. He is a well-known and prominent business man of ability and character, and is fully equipped with a practical knowledge of hardware, and is familiar also with the broader questions of policy and finance. The treasurer, Otto C. Schiffmann, has been with the house for 13 years, first as junior clerk and gradually working his way up to general manager of the office. Louis M. French, the secretary, has been with the firm 11 years, for the past few years in charge of the mail order department, to the development of which much attention has recently been given. The directors of the new corporation are: H. Kirke White of Detroit, Mich., who is widely known by reason of his connection with large business affairs; E. C. Van Glahn, A. B. Haulenbeek, O. C. Schiffmann and L. M. French, the last four having been long identified with the concern, and having built it up to its present gratifying proportions. The new corporation starts in business with a capital stock of $400,000, of which $150,000 will be 7 per cent. preferred stock and the remaining $250,000 will be common stock. All the common stock has been subscribed for in advance, as well as a large part of the preferred stock.

A Vent Wire Screen.

A vent screen for use in schoolhouses, public buildings, churches and the like, made of wire fixed in a frame of angle iron, is shown in Fig. 10 of the accompanying illustrations, which represents a portion of the screen. It is one pattern of the guards made by the Syracuse Wire Works, Syracuse, N. Y. One side of the angle is set into the opening and the other lies on the face of the wall, making a finished surface. The scheme for enhancing the appearance can, of course, be used also for warm air heating and for steam heating, and the claim that a maximum amount of air will pass through a guard of a given size seems reasonable when the openness of the meshwork is noted. More ornamental styles can be had, and, of course, the screen has the further advantage of being light in weight.

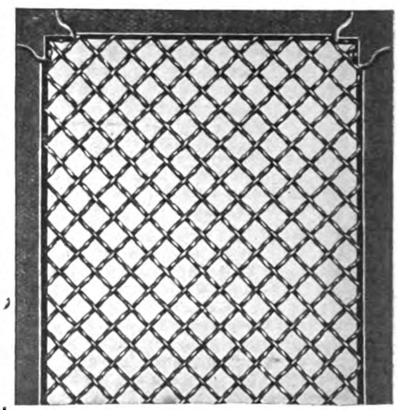


Fig. 10.—A Vent Wire Screen.

TRADE NOTES.

THE NORTHWESTERN EXPANDED METAL COMPANY, 930 to 950 Old Colony Building, Chicago, Ill., and with factory at Canton, Ohio, has just issued an interesting little pamphlet of 24 pages relating to concrete slabs reinforced with expanded metal and designed for use in connection with roof and floor construction. A number of valuable tables are presented calculated in accordance with Building Ordinance Regulations, and the claim is made that the user of the tables can be certain that all the slabs described will develop much higher carrying capacity than is shown. The point is made that when the reinforcement runs in a diagonal direction it should be the main reinforcement and not merely small binding material to form a mesh. Expanded metal, because of its diamond mesh form, is claimed to have all the reinforcement at practically the proper angle with the lines of fracture in slabs, and it is also excellent for concentrated loads. An interesting feature is a list of books which the company recommends to those desiring information on concrete construction work.

THE GAGE TOOL COMPANY, Vineland, N. J., is directing the attention of the trade to its self-setting plane by means of 4-in. rules of wood which it is distributing gratis to those making application for them. One edge is marked off into eighths of an inch and the other edge into sixteenths. Reference is made to the merits of the self-setting planes and the ease and rapidity with which they are set. There is also a list of names and addresses of some of the many concerns selling these planes.

THE G. DROUVE COMPANY, Bridgeport, Conn., recently purchased at receiver's sale all the machinery, material and fixtures of the American Machinery Company, 651 West Forty-third street, New York City.

H. C. MARSH COMPANY, Rockford, Ill., has brought out an improved miter box which it is claimed has been carefully designed to meet a very broad range of work. It is known as the Marsh-Ayer miter box, and is strongly built for hard service. It is finished in dull nickel. Those of our readers who are interested can secure circulars relating to the miter box by addressing the company.

MAX L. KEITH, 604 Lumber Exchange, Minneapolis, Minn., makes an announcement with regard to a book of plans of cement houses which is likely to prove of general interest to a large class of builders. The plans are for concrete block, as well as of cement and English half-timber designs. The particulars of the offer will be found in our advertising pages this month.

ONE of the strong claims put forth for the Chamberlain metal weather strip made by the Chamberlin Metal Weather Strip Company, Detroit, Mich., is the reduced fuel consumption which ensues from its use. This is brought about by properly insulating all windows so that uncontrolled air may be eliminated. This merit of the weather strip has more and more attracted the attention of architects and heating engineers, and some of the latter have made careful tests to determine the exact value of the Chamberlin strip in this connection. It is stated that these tests show that this weather strip excluded 90 per cent. of the air which window sashes with 1-16 in. clearance admits. The tests were made by forcing air from a blower against sashes with and without the weather strip applied.

THE DEFIANCE MACHINE WORKS, Defiance, Ohio, is directing the attention of woodworkers generally to its 24-in. single surface planer known as the Defiance, and which is adapted for doing a variety of work, such as balusters, table legs, barrel hoops, handles of all kinds, insulator pins, oval wood dishes, &c., &c. The machine embodies the latest features, and is referred to as well calculated to maintain the claims put forth concerning it.

SCHURING BROS., R. F. D. 4, Washington, D. C., have brought out a device which they call "Saw Easy," because it automatically oils the mechanic's hand saw while he is using it. The flow of oil can readily be regulated or closed off altogether, according to requirements. It can be attached to the saw in an instant or it can be used in connection with the sharpening of tools. It is referred to as a time and muscle saver, and will be sent to any address on receipt of 25 cents. If it is not satisfactory the manufacturers state that the money will be refunded.

THE SIDNEY TOOL COMPANY, Sidney, Ohio, points out that in its latest catalogue reference is made to the many equipments which are furnished with its Universal woodworker. These requirements range all the way from a plain 10-in. jointer up to a jointer, rip and cutoff table; 20 in. or 27 in. band saw, boring machine, mortiser, tenoner, shaper, two side molder and power drum sander. The machine is referred to as both a money and time saver.

THE RAYMOND CONCRETE PILE COMPANY, 90 West street, New York City, has been awarded a number of contracts, among which may be mentioned that of placing concrete piles in the foundations of the new Post Office which is being erected at St. Louis, Mo., and which will require about 55,000 ft. of piling; and the placing of concrete piles in the foundation of a grocery warehouse building at Canal and Greenwich streets, New York City. The structure will be six stories in hight, but the foundations are designed to support three additional stories should they be required. On account of the purpose to which the building will be devoted the foundations will be called upon to sustain unusually heavy loads.

"METAL BUILDING MATERIALS" is the title of a pamphlet of a size convenient to carry in the vest pocket, which has just been sent out by the Berger Mfg. Company, Canton, Ohio. The materials are intended for partitions, floors, roofs, sidewalk lights, and for concrete reinforcement. Special reference is made to the Berger Prong Lock System of steel studs or solid and hollow partitions, wall and ceiling furring, also to Berger's metal lumber, extended reference to which has already been made in these columns. The little work will be found of special interest to architects and builders, who can readily secure a copy on application.

LEAFLETS sent out by the McLain-Garwood Company, Canton, Ohio, illustrate and briefly describe the Garwood steam heaters for using gas as a fuel, and the Garwood gas logs, which are said to be suitable for any fireplace. The goods are attractive in appearance and the heaters are finished in a variety of styles, thus enabling the finish to harmonize with that of the room in which they might be used.

THE EASTERN GRANITE ROOFING COMPANY, 1 Hudson street, New York, is offering Evertite roofing, which presents to the weather a layer of crushed rock, firmly imbedded under great pressure into the composition. The rock is designed to take the brunt of the storm, so that the wearing force and friction of rain drops or hail does not reach the waterproofing felt at all. The only actual wear on the top layer of composition is said to be that of slowly trickling water or melting snow, which cannot damage it a particle. It is pointed out that the surface of crushed rock takes the place of all coating or painting, and that the roof requires no further attention of any kind after it is once laid. The company also manufactures the Tisbest and Granite brands of roofing.

THE NORTHWESTERN COMPO-BOARD COMPANY, Minneapolis, Minn., is sending out some interesting literature relative to the claims made for compo-board, which is intended as a substitute for lath and plaster. The board is manufactured in varying lengths, all 4 ft. wide, can be cut with any saw and nailed directly to the studding by any carpenter. The point is made that this material is easily and quickly applied, renders a building warmer and more durable than where plaster is employed, and that its use effects a saving in time and fuel while rendering a building more healthful. It is claimed to be wind and dustproof, is a nonconductor of heat and cold, and is well adapted for covering with burlap or wallpaper, although it can be painted, kalsomined or decorated in various ways similar to plaster. Full particulars regarding the compo-board, together with samples of the material itself, will be sent to any architect or builder upon application.

THE HANDY INDEX COMPANY, 1713 Tribune Building, New York City, is distributing what is known as the Handy Index, a little work of 64 pages carrying the names of leading manufacturers of goods likely to be of interest to architects, builders, contractors and engineers. The names of the goods manufactured are arranged in alphabetical order so as to greatly facilitate reference on the part of those seeking the names of makers of certain lines of goods or supplying specified materials. In addition to the lists in question are many pages carrying the advertising announcements of concerns engaged in the lines indicated. A copy of the index can be secured free of charge by making application to the company named.

THE KITTANNING BRICK & FIRE CLAY COMPANY, Pittsburgh, Pa., are distributing a very attractive pamphlet of 88 pages carrying illustrations of the most frequently used specially shaped and ornamental bricks manufactured by the concern. The bricks are made by the stiff mud process from the best grades of vitrified plastic clays found in Pennsylvania burned exclusively with natural gas. The company makes light and dark buff, almost white and dark gray, mottled in gray and buff colored brick. While the pamphlet shows only a partial list of many molds carried in stock, the company is prepared to make molded and shaped brick of every description from special designs.

GEORGE W. GRAVES, architect, will occupy on January 1 his new office in the Rowland Building, at 179 Shelby street, Detroit, Mich.

Carpentry and Building

PUBLISHED MONTHLY

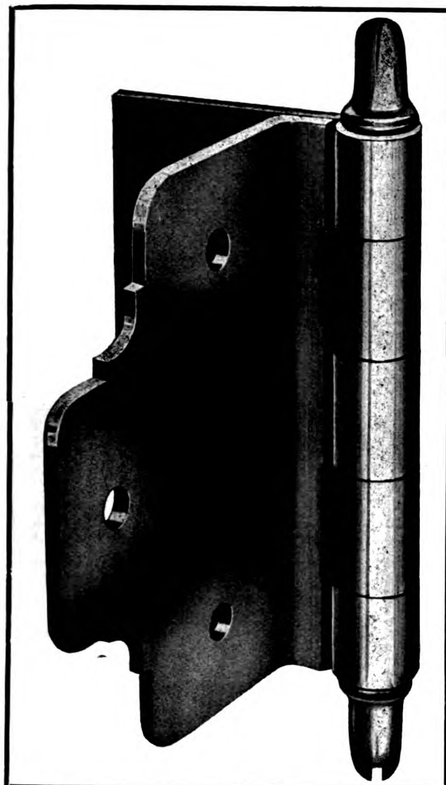
To all parts United States and Mexico, ...	$1.00 Per Year
To all other Countries, ...	1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS .... 14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager...Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager .... Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager .... Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager .... Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager .... Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager .... The Cuyahoga, 311 Superior Street.

ENTERED AT THE POST OFFICE NEW YORK AS SECOND-CLASS MATTER



STYLE No. 400.

We Initiate—Never Imitate.

Contractors Say

THE

"NATIONAL"

WAY "IS THE ONLY HINGE WAY"

The following reasons have convinced them :

LABOR SAVING :—Contractors say they save 100 per cent. in the time required to hang doors, as there is only one side to mortise, the ornamental leaf being screwed to the surface of the door.

GREAT STRENGTH and RIGIDITY :—The screws in the ornamental leaf are subjected to a shearing strain so the butts will sustain a third more weight than a common butt of the same size.

SLOT IN FALSE TIP :—There is a slot in the false tip which makes it very easy to remove the tip when the threads become corroded after the butts have been a long time in use.

Send for Booklet "C" and give dealer's name.

NATIONAL MANUFACTURING COMPANY,

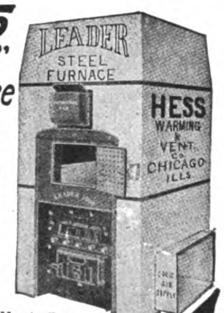
STERLING, - ILL.

EVERYTHING For Furnace Work

No. 45 "Leader" Steel Furnace

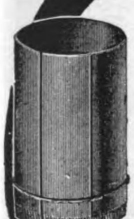
PRICE $49.00

PIPES and REGISTERS EXTRA
Delivered to any station east of Omaha and north of the Ohio River.



Heats 7 or 8 Rooms

An ounce of performance is worth a pound of promise. This truism aptly applies to the problem of **real saving** and **perfect satisfaction** in heating the home. Read our offer. It places all the responsibility on us. We have to make good. You take no risk.



Round Tin Pipe

On Free Trial at OUR Expense

We will send you a complete furnace heating outfit, including pipes, registers, and everything needed, for $25 to $100 less than you can buy from dealers, and deliver it at your station, freight prepaid. You may place the purchase price in the hands of your local banker, who will hold it while you test the heater.

If the test is not satisfactory you may return the goods at our expense and have your money back, we to pay cost of removal and freight charges both ways. Ask us more about it. There's money in it for you. Our great co-operative plan makes you a partner in our success. We explain this with every estimate. This offer applies also to heating equipments for churches, schools, stores or other buildings. Write to-day.

Ask for Our Free Heating Plans

Send us a rough sketch of any building you wish to heat and without any charge or obligation on your part we will have our experts prepare a simple, clear plan which you can easily understand, showing every detail of the furnace, pipes, registers, etc., in their proper places, with the exact cost to you of the equipment delivered at your station, freight prepaid. With our easy-to-follow plans and instructions any handy man can install the Hess Furnace and Outfit. We loan the tools Free.

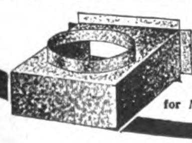
Our Free Booklets

Our booklet "**Modern Furnace Heating**" clearly explains principles that cannot be ignored if the heating of any building is to be accomplished perfectly and at the same time economically. This booklet is written so that anyone can easily understand the diagram illustrations and principles involved. It covers the entire heating proposition thoroughly and contains much heating information of great value.

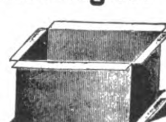
The booklet "**These Bear Witness**" gives the names and addresses of hundreds of people in every state and territory (many of them perhaps your neighbors) who have and are using the Hess Steel Furnace and outfit and to whom we refer as having found our furnace the best in heating capacity and most inexpensive in first cost and fuel consumption.

Write today for Booklets **Hess Warming & Ventilating Co.** 909 Tacoma Bldg. CHICAGO

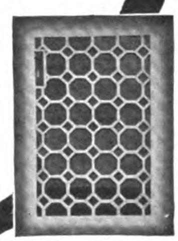
Scale Design Side-Wall Register and Frame



Air Supply Stub No. 2 for Metal Pipe



Box for Ceiling Register

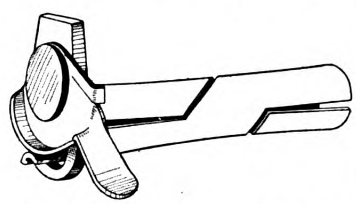


Moorish Design Reversible Wafer Side-Wall Register

Novelties.

Raynesford's Improved Bench Stop.

A new tool which every practical carpenter is likely to appreciate is the bench stop illustrated herewith, and which has just been placed upon the market by Raynesford & Sons, Ellis, Kan. Fig. 1 shows the general appearance of the tool itself, while Fig. 2 shows its application to a bench. The stop is made of steel and has a slightly oxidized copper finish. It is 4½ in. long and projects beyond the work less than half an inch. In order to make use of the stop its barrel is inserted part way in one of the several holes in the apron of the bench, placing the jaw up and the lever to the right. One end of the work is then placed in the vise and the other on the barrel of the stop, the edge being pressed firmly against the work. It is then only necessary to press the lever down sufficiently to lock firmly and proceed to work. In case a number of boards of the same width are to be edged the bench stop may be locked in the proper hole, so that the work will slip in or out readily, and then it need not be changed or moved until all the boards are edged. In this way time is saved by not having



Novelties.—Raynesford's Improved Bench Stop.—Fig. 1.—General View of the Device.

to adjust for each board separately. The manufacturers point out that in order to insure the proper working of the bench stop care should be taken that the holes in the apron of the bench are full ¾ in. and clean cut. A 2 x 4 must be placed behind each row of holes, securely fastened to the apron, and then the several holes continued through the 2 x 4 in. piece. This is done so as to provide sufficient depth in the holes to furnish a bearing for the jaws of the barrel of the bench stop.

Importance of Sheet Metal in Building Construction.

The extent to which sheet metal is at present being used in connection with building construction is realized by comparatively few outside the industry, yet with the increasing cost of materials formerly employed, with the more rigorous exactions of the insurance authorities combined with the general willingness to adopt the promising improvements of these fast moving times, sheet metal has attained a prominence in building and house equipment that would have been thought improbable a few years ago. The fire resisting qualities of metal coverings have had much to do with the development of the sheet metal business, and the present extensive adoption of the material in connection with building matters has been a steady though gradual one. An interesting point is the widely different purposes for which sheet metal may be used in connection with building construction, yet its adaptability for exterior and interior decoration is pretty generally recognized. A notable example of the architectural effect produced by the use of sheet metal is found in connection with the plant of a concern in Cincinnati where the old building of the American Tool Works Company was remodeled at comparatively small cost. The alterations consisted of the application of the Edwards Patent Rock Face Brick and Stone Siding, galvanized cornice and pediments, window caps, &c., making a durable and fireproof structure. The metal siding in question is made from Bessemer or open hearth steel, and is furnished painted or galvanized, closely imitating rock face stone and brick. The work in question was done by the Edwards Mfg. Company, "The Sheet Metal Folks," 423 to 443 Eggleston avenue, Cincinnati, Ohio. This concern is a very large maker of sheet metal building material, their products comprising metal ceilings, shingles, Spanish tile roofing and siding, cornices, skylights, ventilators, eave trough and conductor pipe, elbows and shoes, metal fireproof window frames and sash, roof gutters, cresting, metal lath and ornamental stamped and spun work in zinc and copper. The patterns of siding and ceiling turned out by this concern and adapted for use in connection with dwellings, schoolhouses, business blocks, factories, &c., &c., are of a nature calculated to interest architects, builders and contractors the country over. A catalogue showing the company's complete line will be sent to any one interested in sheet metal building material.

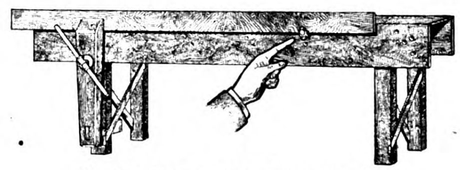


Fig. 2.—Stop as Applied to a Bench.

The Marsh-Ayer Miter Box.

The H. C. Marsh Company, Rockford, Ill., is offering the miter box shown in Fig. 3 of the cuts. The bed and back are cast in one piece to give increased strength to the frame and to avoid the plates getting out of adjustment. They are ribbed to give clearance for sawdust, and the ribs are designed to help hold the stock in position without marring it. An improved form of saw guide stop, entirely inclosed within the guide, and thus practically immune from injury, holds the saw in an elevated position while the work is being adjusted and prevents the guides being withdrawn from the posts as the saw is raised. The stop is released by pressing down on the saw. In addition to notches for the positive and commonly used angles, there is a degree scale showing the actual angle of the saw. There is also a convenient device for securely locking the swinging lever at any angle, which is operated by means of the finger latch. Length gauges for duplicate lengths up to 18 in. may be swung instantly into position from behind the box, as they are set on a swivel, and may, if desired, be used as back rests for cutting angles more acute than 45 degrees. The stock gauges, near the top of the back, for cutting crown moldings, are conveniently located for clamping together several pieces that are to be cut simultaneously; it may also be left set when crown moldings and flat casings are being cut alternately, as in the case of inside finish with a back band. A feature of the box is the dull nickel finish, which is not paint, but an actual nickel plate. The saw guides, degree scale and all steel pieces are brightly polished.

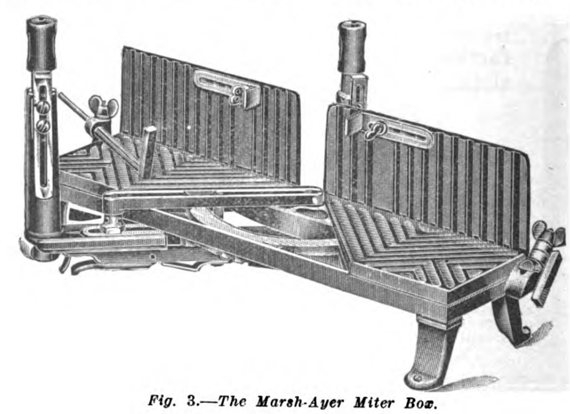
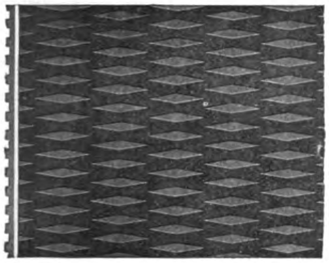


Fig. 3.—The Marsh-Ayer Miter Box.

Importance of Perfect Lighting.

The firm of I. P. Frink, 551 Pearl street, New York City, whose history runs back to the time when there was neither gas nor electricity, has always shown an extraordinary degree of intuition in perceiving the tendency of illumination practice and in keeping not only abreast of this practical art, but at its head. Their recent catalogue, No. 56, on Tungsten reflectors, &c., is an interesting proof of commercial alertness, for its contents deal with the new Tungsten lamps and show a full grasp of the situation. These special reflectors embody all the essential conditions that are necessary in dealing with the new illuminant, and offer many practical ideas that should be welcomed by architects and builders. A number of contracts have been recently taken by this concern for lighting large buildings. The new National City Bank Building, New York, which was formerly the United States Custom House, is lighted by the Frink system, using the same novel features that have been installed in the Importers' and Traders' National Bank. Among other contracts is that of the Historical Society Building at Albany, where the system of lighting is the same as in use in the Metropolitan Museum of Art, New York. The Biological Society Building at Princeton, N. J., will also be illuminated by Frink reflectors, the main room being fitted with concealed lights. The



Novelties.—Fig. 4.—Wrought Steel Floor Plates.

Normal School Building at Albany is another large installation that this firm is now completing.

Wrought Steel Floor Plates.

The Keystone Steel Company, whose central and sales offices are at Warren, Pa., has just completed in its mill at Wilmington, Del., the installation of what is claimed to be the largest and most efficient equipment in the world for the exclusive manufacture of wrought steel floor plates and shapes, such as are shown in Fig. 4 of the cuts. The vice-president of the company has had extensive experience in floor plate manufacture and has installed appliances which are entirely new and which are very effective in producing flat plates. In the manufacture of these products the Keystone Steel Company will hereafter be a specialist. The company owns patents which it believes cover the only arrangement of rolls known at the present time whereby the diamond ribbed and checkered patterns of steel floor plates and treads can be rolled absolutely flat and straight. They are also sheared accurately to specified size and form, thereby effecting a saving to the users by avoiding the time consuming and expensive necessity, which has previously existed, of straightening and trimming to proper size by hand, after the plates have been delivered. Realizing the importance of accurate cutting to specified size and shape, the company has installed specially built shears of the most improved type and largest capacity. The plates are made of open hearth steel of boiler plate quality. The high ductility of this steel causes it to sag or bend when overloaded, thus giving ample warning of dangerous conditions. The plates are of such strength, however, that a 5-16 in. plate weighing 13¾ lb. per square foot will carry 222 lb. on a 3-ft. span.

Linduro Enamel.

The Lowe Brothers Company, Dayton, Ohio, is now prepared to supply its Linduro enamel in any quantities that may be desired. The product is designed for use on wood, plaster, brick, stone, cement, metals, porcelain, concrete, glass and paper, and on buildings, furniture, bathtubs, cars, boats, &c., in short, wherever a hard, durable surface is desired. It is referred to as having a high gloss that is hard and clear, and as showing no laps or brush marks. It may also be rubbed to a dull finish. The company claims that the enamel will not crack, peel, check, chalk or fail in other ways. It is made in white, cream and ivory, ready for use on the finest work, and may be tinted as required to carry out any scheme of decoration.

Royal Standard Planer, Matcher and Molder.

A machine which is especially adapted for small planing and sawmills while meeting the requirements of other woodworking shops having limited room and power and where a small combination machine is needed for planing top side and dressing two edges of such work as flooring, ceiling, wainscoting, partition, casing, siding and a multitude of other moldings, is presented in general view in Fig. 5 of the illustrations. The machine, it is pointed out, is capable of doing a great variety of well finished work owing to its weight, belt power, size of journals, good workmanship and fine adjustable features. The frame is of generous proportions, thoroughly ribbed throughout and has great strength and rigidity. The table is made in one piece and its top plate in the rough is over 1 in. thick with bracer arches on the under side, thus reducing any tendency to vibration to a minimum. It is fitted to the frame by what is known as the Cordesman's Patent Process, namely, that of four ways, all far apart and very deep and provided with dovetail gibs and screws in such a manner that the mere turn of the gib screw locks the table to the frame in a most secure manner. The table may be adjusted while the operator is in a standing position, a rule in plain view telling the space under the cutter head. The feed works are of simple construction and may be instantly stopped and started. The upper rolls are powerfully geared, while the feed gears are made expansive through a novel arrangement and cannot disengage. The matcher spindles revolve in long split boxes and both upper and lower spindle boxes are connected by webs and gibbed to two horizontal bearings securely fastened to the table. The matcher spindles with heads move up and down with the table. They have a lateral adjustment for the different widths of boards, and are provided with patent chip breaking device to prevent slivering and breaking out all knotty and cross grained lumber. The machine here shown is made by the Cordesman-Rechtin Company, Butler street, Cincinnati, Ohio, who refers especially to the extra large clearance around the matcher heads, which allows working the top and two under side bevels on such work as crown and sprung molds in one operation—something, it is pointed out, that is possible on few if any machines of similar size. The machine is known as the Royal Standard Planer, Matcher and Molder, and the No. 17 size has a capacity for planing up to 24¼ in. wide and from 1-16 in. up to 7 in. thick; for matching up to 12 in. wide and from ⅜ in. up to 2 in. thick, although on order and at small extra cost the company will furnish matcher heads that will carry cutters for matching up to 3 in. thick. The tight and loose pulleys are 10 in. in diameter by 5½ in. face, and the countershaft should make 1050 rev. per min. The No. 18 size machine has a capacity for planing up to 26 in. wide and matches up to 14 in. wide, the other dimensions being the same as in connection with the No. 17 machine. The tight and loose pulleys are 12 in. in diameter by 5½ in. face; the countershaft also having a speed of 1050 rev. per min.

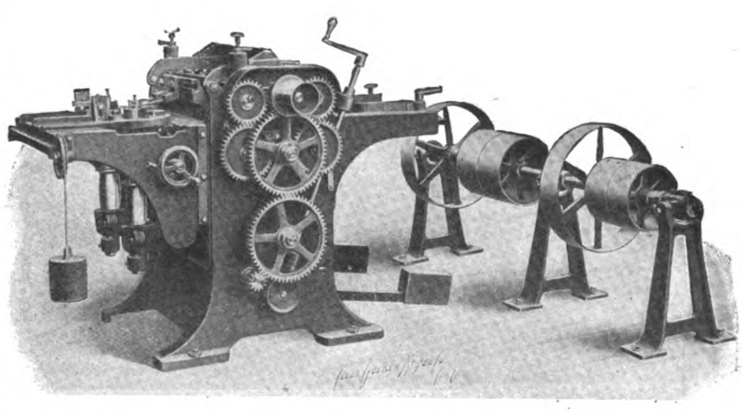


Fig. 5.—Royal Standard Planer, Matcher and Molder.

Convention of Berger Mfg. Company Salesmen.

A convention of salesmen of the Berger Mfg. Company was held in Canton, Ohio, December 28 to January 2, inclusive, when some 84 individuals, comprising the officers and sales organization of the company participated. The convention is the third one held by the company, and proved to be the largest and most successful of all. Advantage was taken of the visit of the salesmen to the works to see and learn something of the actual processes of manufacture, and on the morning of the last day of the convention a trip through the factory was taken. The more strictly business matters were also enlivened through the chance to witness on Tuesday, December 29, the ascension of the airship Ohio under the auspices of the Aero Club of Canton, while on Friday morning the convention visited in a body the McKinley monument. The convention was brought to a close by a banquet held at Courtland Hotel, when Treasurer F. A. Schwertner acted as toastmaster. The toast list was as follows: "An Off Year," by President and General Manager Ed. A. Langenbach; "New Associations," by First Vice-President F. H. Snyder; "Our Policy," by Second Vice-President R. H. Yancey; "Sand and Snags," by General Manager of Branches William S. Langenbach; "Personal Element," by A. T. Enlow, manager of sales; and "Sounding the Trumpet," by W. W. Wallace, manager of the advertising department.

TRADE NOTES.

THE STAR EXPANSION BOLT COMPANY, 147 Cedar street, New York City, has been distributing among its friends in the trade an exceedingly attractive calendar for the new year consisting of a panel measuring a little more than 9 x 11 in. and carrying the famous address at Gettysburg of Abraham Lincoln, together with a likeness of the martyred President and a facsimile of his signature. Attached to the bottom of the card is the calendar proper, consisting of 12 slips 4 in. in width and only 1½ in. in hight. The only matter of an advertising nature is a line in small script type giving the name and address of the company.

THE January number of the Cortright Metal Shingle Advocate contains much that is of interest to the up to date roofer. The leading article deals with the "Cortright Metal Shingle Roof," and half-tone illustrations are given of a church at North Rose, N. Y., on which this form of roofing was used. Views are also given of metal slates and Victoria shingles showing the stamping which the company places upon every piece of its roofing. Not the least interesting feature of the Advocate, which is issued by the Cortright Metal Roofing Company, Philadelphia, Pa., and Chicago, Ill., is a calendar for the first six months of the current year. Those of our readers who are interested can secure a copy of the Advocate free of charge on application.

THE MONTROSS METAL SHINGLE COMPANY, 108 Erie street, Camden, N. J., refers to the shingles which it is prepared to furnish as being easily laid, only a hammer and nails being required for the purpose. Emphasis is laid upon the fact that the shingles never scale or leak; that they are fire and storm proof, as well as light, durable and inexpensive. An illustrated catalogue which the company has issued describes the shingles and their merits in detail, and a copy of it can be obtained by any one sufficiently interested to make application for it.

BUILDING MECHANICS who make a practice of putting on slate roofs are likely to be interested in the line of tools for this purpose which is being offered the trade by the Belden Machine Company, New Haven, Conn. The sets turned out by this concern are made up of a hammer, a ripper, a stake and a punch. The hammers are referred to as being perfectly balanced and made of steel with leather handles to prevent the hand from slipping. The stakes are made of forged iron and steel, as are also the rippers, which are strong and durable.

A VERY ATTRACTIVE PAMPHLET illustrated with half-tone engravings and relating to the white stainless cement for the setting of marble, limestone, granite and other natural stones, is being sent out by the Blanc Stainless Cement Company, Allentown, Pa., and with New York office at 5 West Thirty-first street, Manhattan. The merits of this white cement, which is offered under the name "Blanc," are set forth at length and in a way to strongly appeal to architects and building contractors. A list of some of the buildings in connection with which the cement has been used for stone setting is given, thus affording a good idea of the popularity of the cement.

THE semiannual gathering of the Eller Mfg. Company's salesmen took place at the offices of the company in Canton, Ohio, January 4, 5 and 6, where routine business for selling the products of the company in the different States was gone over. The men left Canton feeling that 1909 will be a splendid year for business. A particularly pleasing feature to the company was the report of each salesman that "Eller's" goods at all times met the approval of their most critical buyers.

THE AMERICAN WOODWORKING MACHINERY COMPANY, with New York offices in the West Street Building, is distributing among its friends in the trade a calendar for 1909. It consists of 12 leaves measuring 16½ x 14½ in. bound at the top by a metal strip and provided with an eye for hanging upon the wall. In the center of each page is a panel containing the days of the week and month, which is surrounded by a group of the company's buildings and some of its leading machines, the number and name being given in connection with each design. The executive offices are located at 591 Lyell avenue, Rochester, N. Y., and the company is also represented in New Orleans, La., Portland, Ore., and Chicago, Ill.

THE CHATTANOOGA ROOFING & FOUNDRY COMPANY, Chattanooga, Tenn., gave its employees a banquet at Hotel Patten, New Year's Eve, which was a most enjoyable affair. President J. E. Annis in reviewing the work for 1908 and forecasting that for 1909, congratulated the employees on their efficiency and thanked them for their loyalty to the company. Brief talks were made by nearly all the department managers and traveling salesmen. President Annis on a recent hunting trip proved his ability as a marksman by shooting enough quail to supply the game for the banquet. The company was organized in 1881 and its shipments of metal shingles and roofing, wrought, cast and sheet metal building material go not only to all parts of this country, but many orders come from foreign lands. The company has a large branch house in New York and supplies its trade in the New England States from that point.

THE WAGNER MFG. COMPANY, Cedar Falls, Iowa, refers to the Wagner Shingle Gauge as a device to quickly gauge and hold a straight edge in laying shingles. By means of this device no nail holes are made in the roof, and it is of such a nature as to give entire satisfaction in operation. The company has issued a circular setting forth the merits of the gauge, and a copy will be sent to any carpenter or builder who may be sufficiently interested to make application.

AMERICAN SHEET & TIN PLATE COMPANY, with general offices in the Frick Building, Pittsburgh, Pa., is offering a new product known as Monel Metal, to be used in lieu of copper sheets. It is referred to as possessing great ductility and flexibility, is readily worked, and is claimed to be an non-corrosive as pure nickel. This product is particularly adapted to roofing, cornices, metal window frames, ventilators, skylights, and in fact, all places where a noncorrosive metal is of first importance. While the tensile strength is said to be three times as great as copper, the expansion and contraction are less. Those of our readers who are interested in this new product can obtain full information by addressing the company.

THE REYNOLDS MACHINE COMPANY, Rock Island, Ill., has removed its plant and business to Moline, Ill., where in addition to its present line of screw driving machines, it will manufacture a Hobbing Spur Gear Cutter, which is described as one of the simplest and most nearly "fool proof" tools of the kind ever put out.

HENRY DISSTON & SONS, Philadelphia, Pa., have been distributing among their friends in the trade a very attractive souvenir of Founders' Week in Philadelphia, it being the 225th anniversary of that city. The souvenir consists of a folded card carrying six colored pictures, showing the Disston exhibit in the industrial parade which occurred on Wednesday, October 7, 1908. The exhibits were in the nature of floats, each drawn by four horses, showing not only a varied line of Disston goods, but also illustrating the improvements in methods making for progression in the manufacture of Disston brand of saws and tools. One float carried a circular saw measuring 100 in. in diameter and weighing 450 lb. The plant for turning out Disston goods consists of 54 buildings, occupying a site of 50 acres and giving employment to 3500 hands.

IN order to handle its constantly increasing business to better advantage, the Raymond Concrete Pile Company of New York and Chicago has recently established two new branch offices, one at 204 Perrin Building, New Orleans, and another at 620 Chestnut street, St. Louis. The New Orleans office is in charge of G. B. Raymond, one of the sons of the late A. A. Raymond, inventor of the pile that bears his name. Mr. Raymond will take care of all business for his company in the Southern States. The St. Louis office is in charge of Warren A. Tyrell, C. E., who has represented the Raymond Company in that city for some time.

A COMPLETE LINE of foot, hand and light power woodworking machinery, which embodies the results of long experience and a practical knowledge of its requirements in design and construction, is shown and described in catalogue No. 20-A, sent out by the Seneca Falls Mfg. Company, Seneca Falls, N. Y. Among the machines illustrated are the No. 5 Union Combination self-feed and cross-cut saw for foot and hand power, and the Union Combination saw, as well as scroll saws, machine bits, molding attachments, groover heads, molders, molding cutters and a number of examples of moldings. The Diamond mortiser and tools used in connection with this machine are also illustrated and described, as well as a wood turning lathe and circular saws and saw blades.

Carpentry and Building

PUBLISHED MONTHLY

To all parts United States and Mexico, ... $1.00 Per Year
To all other Countries, ... 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES

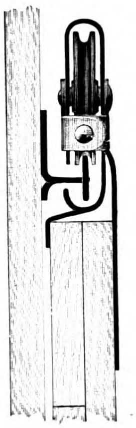
NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS .... 14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager... Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........ Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........ Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........ Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........ Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........ The Cuyahoga, 311 Superior Street.

ENTERED AT THE POSTOFFICE NEW YORK AS SECOND-CLASS MATTER

NOVELTIES.

The Sharon Flexible Barn Door Hanger.

A new flexible barn door hanger known as the Sharon, and of which an end view is presented in Fig. 1 of the accompanying illustrations, has just been placed upon the market by the Sharon Hardware Mfg. Company, Sharon, Pa. The reinforced frame of the hanger is claimed to give it twice the strength of the ordi-



Novelties.—Fig. 1.—End View of Sharon Flexible Barn Door Hanger.

nary swing hanger by affording the axle double support and relieving the cover of the full weight of a heavy door. It is an entirely antifriction hanger, as the wheels run on roller bearings, and the axle is galvanized, so that it will not rust. The drop strap being connected over the center of the rail gives an even bearing on the axle, and with the short clevis projecting down inside clamps the door and holds it rigidly in its place as shown in the end view. The claim is made that the door can be swung out to any desired position without causing any strain on either hanger or rail, and is so constructed that it is impossible to derail the hanger.

Fig. 2.—The Robertson Concave Tool Grinder.

The company refers to the hanger as being of very strong construction, and as possessing many good features To those who are interested in goods of this character the company will send an attractive booklet illustrating its trolley, as well as other styles of hangers and track.

The Robertson Concave Tool Grinder.

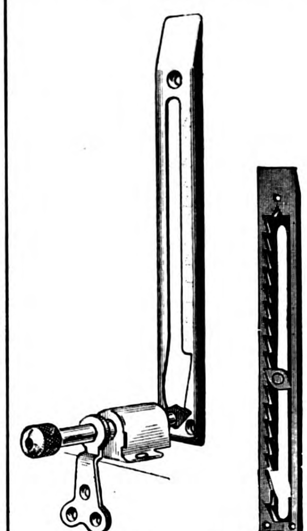
A tool which is adapted for all kinds of light grinding, more especially for mechanics' tools, such as chisels, plane irons, etc., is the device which we illustrate in Fig. 2, and which is being introduced to the trade by the Robertson Drill & Tool Company, 1848 Niagara street, Buffalo, N. Y. A universal tool carriage is furnished, making it possible, it is claimed, for the least experienced user to grind the tools with the greatest ease and at the same time more perfectly than could be done in any other way. With the tool clamped in the carriage the operation consists in simply using the right hand to turn the handle, while the left hand, holding the tool, applies a light pressure and movement back and forth across the wheel, it being guided by the sliding bar, which is adjusted to give any bevel required. The machine is compact and extremely rigid, the main frame being designed as a gear case, protecting the gears and forming what is known as the box pattern. The gears, four in number, are fine cut from the solid metal, producing, it is claimed, a noiseless, smooth running tool. The handle has a new gravity ball clutch in its hub on the main shaft, allowing the handle to be held stationary at any point, and the wheel to revolve. The bench clamp is cast with the frame, and is provided with a ½ in. screw for tightening to the table or bench. The claim is made that tools ground on this machine are concave, which saves many hours' time, as well as wearing of expensive oil stones, as the edge is rendered very sharp with a few rubs. For ordinary grinding of other articles the tool carriage can readily be taken off the sliding bar and it can be used as a rest. The machine is furnished with a 6 x ¾ in. solid emery wheel.

An Outfit of Small Tools.

The J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio, calls attention to an article which appeared in the February issue of *Carpentry and Building*, entitled "Machinery for Small Woodworking Shop," wherein the writer states that in starting out to fit up a carpenter shop in a country town he would suggest as the power equipment a 3 or 4 hp. gasoline engine, a rip saw, a small band or scroll saw, a turning lathe and a light planer. The company in question desires to emphasize the fact that it manufactures a small outfit of this kind, referring especially to its rip saw table, which can be used in many ways for ripping long or short stock and edging material preparatory to joining. The company states that with the use of a lathe and a scroll saw the carpenter can thus utilize all scrap material, while at the same time he can turn out an almost endless variety of special decorative woodwork, such as corner blocks, balusters, &c., as well as various wood novelties. With the company's light planer a large amount of hand planing can be avoided, and some idea of the popularity of the machine may be gained from the claim of the manufacturer that more than 2000 are now in use. The company points out that where shops are not equipped with the necessary power to operate such machines a small gasoline engine will readily do the work, while those which have electric power available can use motors in connection with each of the machines in the outfit. The tendency of the times is toward economy of operation, and we have no doubt that many of our readers will be interested in the outfit of small tools, which the company named is offering at a figure which cannot fail to command attention.

Climax Automatic Ventilating Sash Lock.

The Climax Lock Ventilator Company, Ellicott Square, Buffalo, N. Y., is manufacturing the ventilating sash lock illustrated in Fig. 3 of the cuts, which represent a front view, also reverse of the lock. The lock permits ventilation by securely locking the sash partially open, either at top or bottom, or both. It is impossible to open the window from the outside by putting an arm through the openings, or by the use of a knife blade, clock spring or tool, because it is necessary to close the



Front View. Reverse of Lock.

Fig. 3.—Climax Automatic Ventilating Sash Lock.

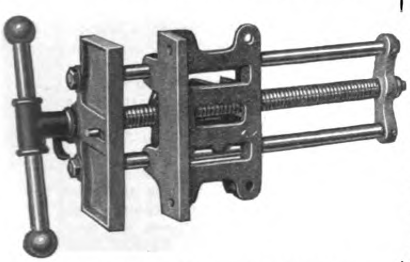
window entirely before it can be opened wide. This can be done, when desired, by letting the bolt head travel over the enlarged opening in the slide. The lock allows a window to be opened 6½ in. from top or bottom, without sacrificing security. By turning the knob to the right as far as it will go the lock will draw the sashes tightly together. It is stated that the lock cannot be pried off with a burglar's jimmy, also that it will withstand a pressure of over 1000 lb. It is explained that the lock is so simple in operation that a child or stupid servant can use it, as a turn of the knob opens it and the closing of the window locks it. The lock can be attached to old or new sash without cutting or marring the sash, only a screwdriver being needed.

Miracle Prize Contest at the Chicago Cement Show.

A feature of the Cement Products Exhibit, held in February, in the Coliseum, Chicago, was a prize contest by the Miracle Pressed Stone Company, Minneapolis, Minn., prizes being offered for the best specimen of product made upon molds or machines of its manufacture. The prizes aggregated $600, divided into three classes, with $200 to each class. Concrete blocks were covered by class 1, while class 2 related to concrete tile and sewer pipe, and class 3, ornamental stone, such as columns, balls, balusters, lawn vases and ornamental brick. In each class there were five prizes, grading from $100, for the first, down to $10, for the last. The purpose of the contest was to stimulate customers of the Miracle Pressed Stone Company to make a better product, and to show them wherein its product could be improved. In the award of the various prizes a wide range of territory was represented, embracing the states of Virginia, Missouri, Minnesota, Washington, Kansas, Tennessee, Illinois, Pennsylvania, Georgia and New York.

A Quick Acting Manual Training Vise.

The combination vise shown in Fig. 4 of the illustrations can be used either as a regular screw or as a quick acting vise. It is unnecessary to reverse the handle to release the racking device so as to open or close the jaws. It is simple in construction, having but eight parts. It is made in



Novelties.—Fig. 4.—A Quick Acting Manual Training Vise.

eight different sizes, with jaws 10 in. long and 4 in. deep. The vise is furnished with wood or leather face on the jaws, as required, and is finished either with or without a taper attachment to the front jaw. The vise is constructed with rods of cold drawn steel, high grade tool steel screws and with jaws of high grade gray iron castings. It is designed especially for manual training schools and woodworking plants, where a fast acting vise at a reasonable cost is required, and is put on the market by the G. M. Yost Mfg. Company, Meadville, Pa.

A New Cement Stone for Building Purposes.

After many years of experimenting and demonstrations under all sorts of conditions the Neo-Lithic Supply Company, Bridgeport, Conn., has recently placed on the market a cement stone which it is claimed possesses many advantages over the concrete block or the Mono-Lithic system. The point is made in connection with the claims to superiority that it is manufactured from "pure concrete, sand and other ingredients absolutely free from iron, and therefore will not discolor or oxidize like marble, while the texture is close and more impervious to moisture than the best Indiana limestone." Further it is claimed that it can be made to resemble the most expensive stone by tool finishing in various ways, while in the unit form. It may also be colored successfully in the mural tints. Any desired pattern or shape can be produced from the smoothest surface to the most elaborate design, at a cost it is claimed to successfully compete with terra cotta or cut stone. It is molded like metal while in the plastic state, and is said to have a crushing strength of 440,000 lb. to the cubic foot. Neo-Lithic or "new stone" is referred to by those who have demonstrated its merits as a high grade cement stone, which is destined to receive most favorable consideration by builders, more especially as the rapid decrease of the timber supply of the country is turning attention more and more to substitute materials for use in the construction of buildings. We understand that the company has a large and comprehensive display of samples at its plant for the inspection of architects, builders, contractors, engineers and others who may be interested.

Universal and Flat Surface Sanding Machine.

The Oakley & Jansen Machinery Company, First and Market streets, Parkersburg, W. Va., are placing on the market a universal and flat surface sanding machine, which it is claimed will sand any work up to 63 in. in length, and of any width. The machine carries a belt 6 in. wide and 19 ft. long, the belt being controlled by a counterweighted idler, as shown at the top of the machine at the extreme right in Fig. 5 of the engravings, which represents a general view of the machine. The pulleys embraced by the sand belt are provided with slotted sliding arms and are adjustable to any position. All bearings are closed and furnished with brass bushings and oil cups. The machine occupies a floor space 4 x 7 ft. in area and weighs 1,000 lb. The tight and loose pulleys are 8 x 3½ in. and should make 750 revolutions per minute. In addition to flat surfaces the machine can be used for sanding all kinds of drawer fronts, whether veneered crosswise or lengthwise.

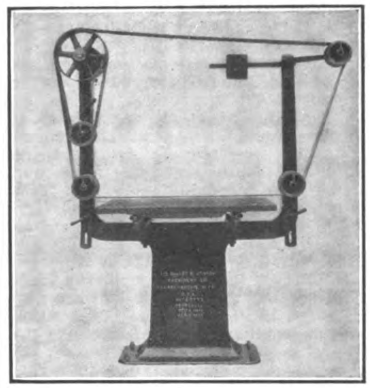


Fig. 5.—Universal and Flat Surface Sanding Machine.

Johnson's Offer to Painters.

With a view to bringing some of its leading products prominently to the attention of painters throughout the country, S. C. Johnson & Son, Racine, Wis., offers to send to any address, free of expense, a sample bottle of Johnson's wood dye, one of Johnson's electric Solvo for removing old finish, one sample package of Johnson's prepared wax, a set of panels showing Johnson's wood dye on different woods—hard and soft—and a copy of its 48 page reference book, entitled, "The Proper Treatment for Floors, Woodwork and Furniture." The concern has found this a very successful plan and during the past year has distributed many thousands of samples. It has found that almost in every case where the samples were asked for by a progressive painter the company has had good results in the way of later business. The company points out that the wood dye is not a stain, but is a real dye, which penetrates the pores, and "in a peculiar way becomes part of the wood itself." It is claimed to protect it so that if the finish is scratched or marred the natural color of the wood is not disclosed. It does not raise the grain and will not lap or streak. It is sold in 15 standard shades. Johnson's prepared wax in paste form is well known by painters and decorators as a finish for floors, but it is claimed to give equally good results on furniture and woodwork. The 48 page pamphlet, "The Proper Treatment of Floors, Woodwork and Furniture," is printed in six colors, contains 80 illustrations, 44 of them in colors, and within its covers is presented a great deal of valuable information based on 27 years of experience with woods and finishes.

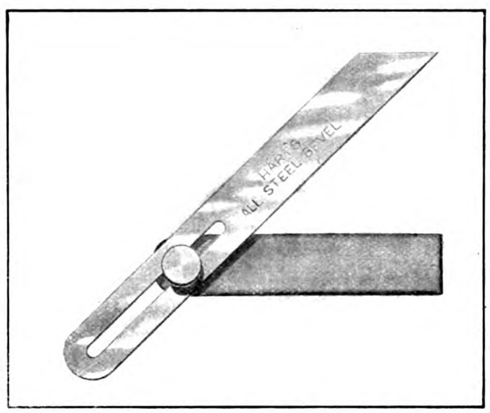


Fig. 6.—Combination All Steel Bevel Try Square and Miter.

Combination All Steel Bevel Try Square and Miter.

The Hart Mfg. Company, Unionville, Conn., is offering the bevel try square and miter, shown in Fig. 6. It is an all steel tool, and when it is desired to use it for a try square the blade is set on the cross mark; when used as a square and for a miter the blade is set on the degrees marked on the base of the bevel. The tool is furnished in polished steel, and also nickel plated. It is recommended as neat and compact, and as occupying less space than a bevel with a wooden base.

The Aladdin Knocked-Down House

The North American Construction Company, Bay City, Mich., has issued a very interesting little pamphlet descriptive of the Aladdin Knocked-Down Houses, which it is prepared to supply for a great variety of purposes. In offering these goods to a discriminating public the company states that the term "Knocked-Down" means just what it says—"A house that has been sawed out, put together, then systematically knocked down and the parts gathered together to send out to purchasers to be put up again." The company points out that Aladdin houses are strong and sturdy, well able to withstand the buffets of the severest storms, and will last for many years. In these houses the best of timber is used and all timber in the frames is dressed on four sides. The 2 x 4 studding are placed 16 in. on centers, making the walls firm and strong, while the joists upon which the floor is laid are also spaced 16 in. on centers. The siding runs lengthwise of the house, and the roof is covered with a prepared roofing, making it impervious to water. The doors are panelled and the windows have sliding sash. The floor of the porch is made of matched boards, and the roof is supported by turned columns. In connection with general views of some of the various kinds of buildings for which Aladdin houses are adapted there are floor plans and general descriptive particulars, including prices, all of which cannot fail to prove of unusual interest and value to many of the readers of this journal. The company claims that no experience or mechanical skill is needed to put together Aladdin houses, and no tools but a hammer is required.

TRADE NOTES.

THE IRWIN AUGER BIT COMPANY, Station D 19, Wilmington, Ohio, is directing attention to the merits of its Irwin auger bits, which are made of a special quality of steel, and is particularly strong where the shank and twist join. These bits are highly finished and fully polished from tip to tip, and are offered in nearly 50 varieties. The boring qualities of the bits are tested in lignum-vitae, which it is well known will turn the edge of most wood-working tools. The heads and cutters are sharpened and finished by hand filing. The claim is made that the bits will not clog, and will bore in the end or side of any wood.

IN referring in our last issue to the product of the North Jersey Paint Company, 1133 Broadway, New York City, we should have mentioned that it was one of the latest waterproofing compounds for the treatment of concrete, etc. It is known as the Edison Waterproofing Paint, and is claimed to be well adapted for the treatment of concrete, cement, brick or stone surfaces.

THE CHICAGO METAL COVERING COMPANY, 67 to 71 North Green street, Chicago, Ill., is directing attention to the metal covered wood moldings of every description, which it is prepared to furnish on short notice. It is sending out among the trade as demonstrating what can be accomplished, a sample of its No. 670 oxidized copper molding, together with a corner piece for use in connection with it. This is made with corner pieces for 1-in. rabbet molding and 1-in. flat molding. The claim is made that by using these corner pieces bad miter joints are avoided and frames can be put together very quickly. The company states that it makes moldings and frames in any style or finish desired.

THE COLTRIN-BOOS MFG. COMPANY, Jackson, Mich., is distributing among contracting builders throughout the country an interesting four-page folder illustrating and briefly describing its leading cement working machinery. The latter includes among others the Boos Adjustable Face Down Concrete Block Machine, the illustrations of which show it as it appears in actual operation, and the Coltrin Concrete Mixer for which strong claims are made. Reference is also made to the Eureka brick machine, the Coltrin cement fence post, and the No. 2 tile mold to form sills, caps, water tables, &c.

THE SHARON HARDWARE MFG. COMPANY, Sharon, Pa., states that its Penn trolley door hanger is made with a detachable drop strap, rendering it easy to put in place. An adjusting screw is below the track, where it is readily accessible, and the wheels run on roller bearings. The claim is made that there is no sticking, binding or scraping. Those who are interested in goods of this character are requested by the company to write for its hanger booklet, a copy of which will be sent free on application to any address.

ONE OF THE FEATURES of the March issue of the "Cortright Metal Shingle Advocate" is a humorous story entitled "The Joke Was on Casey," in which is emphasized the distinguishing points of the shingles turned out by the Cortright Metal Roofing Company, 50 North Twenty-third street, Philadelphia, Pa. The issue contains the usual amount of attractive matter relative to the roofing produced by this enterprising concern, and it is illustrated by several half-tone engravings of buildings in connection with which Cortright roofing has been employed. There is also more or less matter of a humorous character which is likely to entertain the general reader as well as those who are connected with the roofing business.

"A SUGGESTION ON PROGRESSIVE Methods" is the title of an interesting booklet broadly distributed by the Pike Mfg. Company, Pike, N. H. It describes in detail the company's combination stock and display cabinets and enumerates the contents of each, while giving full particulars concerning the company's various oilstone assortments. The company will send a copy of the little pamphlet to any one sufficiently interested in oilstones or abrasives to write for it.

THE PERFECTION MFG. COMPANY, 48 West Patterson avenue, Columbus, Ohio, is pointing out to practical carpenters and builders that they cannot afford to be without the Perfection door lock mortiser, as "it saves its cost on the first job." It is fitted with automatic ball bearings and each machine is furnished with a 1 1-16 in. bit. In operating the device it is only necessary to set the cam for any size mortise desired, then clamp it on the door, turn the crank handle and the "machine does the rest."

THE point is made by the Samson Cordage Works, Boston, Mass., that the Samson spot sash cord can be distinguished at a glance by the trademark—the colored spots. There is only one grade of this cord manufactured, and architects, builders and contractors who may be interested can secure samples with other valuable information by addressing the company.

THE NATIONAL SAW COMPANY, Newark, N. J., has recently issued from the press a very interesting catalogue of 126 pages, bound in board covers and relating to its greatly enlarged line of saws and tools which it is offering the trade. To those who know the company only as saw makers the company desires to direct particular attention to the new lines which have been added, namely, swages, hack saws, try squares, bevels, plumbs and levels, gauges, screwdrivers, &c. These new goods as well as the old ones are referred to as being of "superior quality, finish and workmanship." The goods are illustrated in great variety, and in connection with the engravings are brief descriptive particulars, including in many instances dimensions, sizes, prices, &c.

THE STAR EXPANSION BOLT COMPANY, Bayonne, N. J., is distributing some interesting leaflets relating to Star Expansion Shields which are said to fit stock bolts and screws and for which strong claims are made. It is pointed out that the Star Expansion Bolts are the kind used by the United States Government as well as by prominent engineers and contractors. Reference is also made to steel toggle bolts which are made in a variety of styles and sizes.

BOSTROM-BRADY MFG. COMPANY, Madison avenue and Garnett street, Atlanta, Ga., has been meeting with a very gratifying demand for its builders' levels, notwithstanding the late dullness in general trade. Recently this demand has been showing an increase, indicating a renewal of building operations throughout the country. The growing business has led to an increase in the executive of the company by the appointment of J. Z. Elliott as secretary, treasurer and general manager.

GRANITE ROOFING is referred to by the maker as being a very substantial and satisfactory covering, especially for railroad and factory use where the areas are large and cost is an important consideration. Granite roofing is not, however, a high priced roofing, but is easily within the reach of everybody who wants to protect a shed or farm building in a thorough manner. Its stone surface makes painting or coating unnecessary; it is easily laid and is proof against fire. Its weight is 140 lb. to the roll. A sample will be sent free on request to the maker, Eastern Granite Roofing Company, with offices in New York, Chicago and St. Louis.

Carpentry and Building

PUBLISHED MONTHLY

To all parts United States and Mexico, ... $1.00 Per Year
To all other Countries, ... 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES

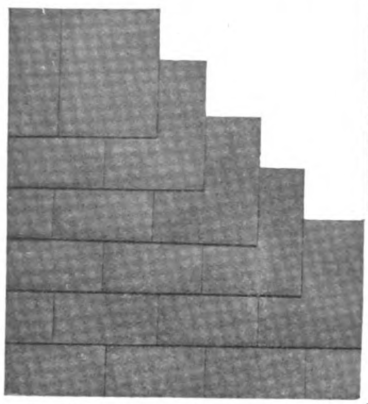
NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS .... 14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager...Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........The Cuyahoga, 311 Superior Street.

ENTERED AT THE POST OFFICE NEW YORK AS SECOND-CLASS MATTER

NOVELTIES.

The Winthrop Asphalt Shingle.

The Winthrop Asphalt Shingle Company, with offices in The Temple, Chicago, Ill., has placed upon the market a shingle which it is claimed will neither warp nor split; is light in weight; attractive in appearance when applied to the building; is readily put in place, and it is pointed out greatly reduces the fire risk of a structure in connection with which it is used. The shingles have the appearance of slate, and being made from asphalt are said to be practically indestructible. The appearance of a portion of several courses of these



Novelties.—Fig. 1.—The Winthrop Asphalt Shingle.

shingles as they appear when applied to a building is presented in Fig. 1 of the cuts. The company points out that while the shingles are fire resisting, the claim is not made that they are "fireproof" in the sense that they cannot be destroyed by fire. They will, however, resist sparks and cinders and flying embers to such an extent that a building is not likely to be set on fire by firebrands falling on a roof covered by these shingles. The latter are 8 x 10 in. in size, are laid 4 in. to the weather; are tapered like a wood shingle and are about ¼ in. thick at the butt where the shingle is solid asphalt reinforced with tough fiber to give it the necessary tensile strength. The shingles are made rigid and are not intended to bend. The color is a gray slate, which darkens a little from exposure to the weather. The claim is made that 450 shingles will cover a space 10 x 10 ft. on a building, or about the same as 1000 wood shingles laid 4 in. to the weather. The usual shingle nails may be used for securing the shingles to the roof, attention being called to the fact that the nail becomes coated with asphalt as it is driven through the shingles, thus preventing the nails from rusting out. The company has issued a very neat catalogue in which the merits of these shingles are set forth at some length, the illustrations being half tone reproductions of photographs of roofs of buildings covered with the shingles in question.

Concrete Mixers.

An attractive catalogue of 31 pages, measuring 5½ x 8 in. in size and issued by the Svenson-Shuman Machine Company, Bessemer Building, Pittsburgh, Pa., shows a proportioning concrete mixer which measures and mixes automatically. The machine has three hoppers which contain respectively stone, sand and cement, and by means of gates the amount of material they feed to the mixer can be regulated. There are only five running parts on the machine, which include a screw conveyor to which the material is fed and which carries it to a main shaft fitted with paddles which perform the mixing operation; a large gear, a friction clutch and a jaw clutch complete the running parts. The machine is simple and strong and has the advantage of mixing the material in plain sight and can be very easily taken apart and cleaned.

The Wagner Winner Barn Door Hanger.

The Wagner Mfg. Company, Cedar Falls, Iowa, is directing attention to the barn door hanger shown in Fig. 2. The wheels are formed up of two sides with polished steel bushing to insure easy, smooth running. The hanger is made entirely of steel, and, being flexible, allows the door to swing out, as shown by the dotted lines. The hanger is adjustable by the aid of a screwdriver either to or from the building, and is arranged so as not to come off the track. The goods are finished in royal blue color with aluminum trimmings.

American School of Correspondence.

Age or distance presents no obstacle to a student who desires to add to his information in any of the special lines of instruction given by the American School of Correspondence, Fifty-eighth street and Drexel avenue, Chicago, Ill. A recent issue of the bulletin of the school presents a map showing the location of the school in Chicago and a picture of the building where the correspondence from its multitude of students receives the personal attention of the resident instructors. Portraits are presented of more than 100 specialists in different

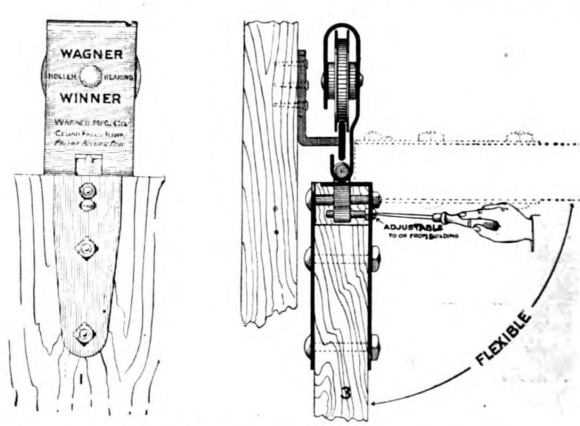


Fig. 2.—The Wagner Winner Barn Door Hanger.

fields whose attention is given to the special needs of the more advanced students. The text describes the methods followed by the school, and the remaining pages of the 116-page catalogue give in detail the matters treated in the courses on architecture, architectural engineering, civil engineering, electrical engineering, mechanical engineering, which includes sheet metal pattern drafting and steam engineering, and sanitary engineering, which includes plumbing and the disposal of wastes, and heating and ventilation. This gives to the ambitious man of whatever age and wherever located the opportunity of securing a copy of the general bulletin, selecting the course of instruction he desires and entering upon it with the assurance that any question which may arise on which he desires instruction will be explained to his full satisfaction.

The Weber Cabinet Scraper and Sandpaperer.

A tool which cannot fail to be appreciated by the carpenter, the cab-

Fig. 3.—The Weber Cabinet Scraper and Sandpaperer.

inet maker, the painter, the interior wood finisher and the furniture maker is the Weber Cabinet Scraper and Sandpaperer, illustrated in general view in Fig. 3 of the engravings, and which is being introduced to the trade by the Weber Mfg. Company, 665 and 667 Seventy-first avenue, West Allis, Wis. The device is referred to as an entirely new departure in this line and embodies valuable features which have long been sought by the practical mechanic. The construction is such that the operator can secure a firm hold upon it and maintain it under perfect control even under adverse circumstances and in tight corners. The Weber knife in the scraper is fastened with a clamp, but there are no holes or slots in it. The claim is made that any length of knife can be used in the clamp and it can be utilized until only ½ in. of it remains. The device can also be reversed and used for sandpapering purposes when so desired. Two or three sheets of sandpaper can be placed in the clamps, and if one sheet will no longer cut it can be torn off and a fresh one takes its place. By removing the sandpaper and substituting emery cloth in the clamp the tool can be used by machinists for polishing purposes. The entire scraper and sandpaperer is said to weigh only 22 oz. The company points out in a booklet and price-list which it has just issued the leading merits of the Weber double acting floor scraper. The 1909 price-list relates to the 10 different machines made by the company, varying in weight from 78 to 135 lb. each, and the maker suggests that the recipient of the list make a selection, tell the company how long it is desired to try it, and the machine will be sent for free trial, so that the builder, carpenter or cabinet maker may test it for himself. The Weber floor scraper has an adjustable blade holder and flexible frame which adapt it to any wooden floor, while the automatic sharpening device en-

Novelties.—Iowa Concrete Cutter and Curbing Edger.—Fig. 4.—The Concrete Cutter.

ables the operator to sharpen a blade without removing it from the machine.

Iowa Concrete Cutter and Curbing Edger.

A new tool for concrete work just added to the line made by the Iowa Novelty Company, Burlington, Iowa, is illustrated in Fig. 4 of the engravings. It is known as a concrete cutter, and is designed to take the place of the ordinary brick mason's trowel, which is generally used for cutting cement sidewalks and curbings into blocks. The trowel is not only of convenient form, but the blade is made for reliable service. The tool here

Fig. 5.—View of the Curbing Edger.

shown has a strong malleable iron handle, nickel plated, and the blade is made of cold rolled steel polished and tempered to the required hardness. The blade is 10 in. in length, 5½ in. in width, tapering to a pointed end, with both sides sharpened. In thickness the blade is No. 16 gauge, and the handle has a width of 7 in. The cutters are packed one-half dozen in paper cartons, weighing 20 lb. per dozen. In Fig. 5 is shown an adjustable curbing edger made by the same concern. It is designed to produce a level facing on the curb with ease and accuracy. It is 7 in. long by 2 in. wide and has 1⅛ in. turned edge with a radius of 1 in. adjustable to ⅝ in. play. It is made in solid bronze and cast iron with aluminum finish; the former weigh 21 lb. and the latter 17 lb. per dozen. A 24-page catalogue which the company has issued sets forth the merits of these and other cement tools which the company manufactures in such variety as to meet many requirements.

The Superior Shingle, Walk and Floor Tile Machine.

A machine which is intended for turning out different shapes of reinforced concrete shingles as well as a variety of shapes and sizes of walk and floor tiles is being brought to the attention of the trade by the Indiana Concrete Form Company, 120 Virginia avenue, Indianapolis, Ind. The machine is made in two sizes intended for operation by one and two men, respectively. A general view of what is known as the "two-man outfit" is shown in Fig. 6 of the engravings. By means of it four shingles are made at each operation. The reinforced concrete shingle produced by the machine is claimed to be of suitable dimension for any style of building on which shingle, slate or tile may be used. The shingles are laid on the roof 7 in. to the weather, thus requiring, it is pointed out, 294 to the square. The claim is made that an expert with one of the company's machines should be able to place two squares per day on the curing racks, where they should remain for 24 hr., when they are removed from the pallets, placed on edge one against the other and should be sprinkled twice a day for a week. For the purpose of nailing the shingles securely in place on a roof two pieces of asbestos board 1 x 1⅜ in. are imbedded in the concrete at the nailing point, thus admitting of the driving of the nails without injury to the shingles. The asbestos is sufficiently pliable to take care of any expansion or contraction, which, of course, must be considered in concrete work exposed to heat and cold. Floor tile are made on the shingle pallets, and may be of any thickness up to 2 in. The walk tile are made on special pallets, which are a part of the outfit, and can be produced up to 16 in., either square, octagon or hexagon. The construction is simple yet effective, and under ordinary use the claim is made that the tile cannot get loose or shift position when put down in good cement mortar. A folder which the company has issued illustrates and describes the two sizes of machine, and also gives an excellent idea of the kind of work which may be produced with them.

Fig. 6.—Superior Shingle, Walk and Floor Tile Machine.

Artistic Mantels.

One of the handsomest catalogues of artistic mantels, fireplaces, grates, grilles, &c., which it has been our privilege to examine for some time past is that just sent out by Charles F. Lorenzen & Co., 276 to 284 North Ashland avenue, Chicago, Ill. It is a work of nearly 100 pages, each measuring 10 x 13¾ in. in size and bound in paper covers of brownish hue illuminated with an interior view in colors showing the reception hall of a modern mansion in which an open fireplace with blazing logs and iron crane is a striking feature. The publication is known as "Illustrated Wholesale Catalogue No. 46," and will be found of special interest and value to architects and contracting builders. The illustrations are for the most part well executed half-tone reproductions from photographs, and are of such liberal proportions as to clearly indicate many interesting details of construction. They serve to afford an excellent idea of the effects produced by various woods in connection with the tile fireplaces, and there are sufficient particulars in combination with sizes, prices, &c., to serve an excellent purpose. Some introductory comments on "The Fireplace" by Mary Y. Robinson are well worth perusal. The designs of fireplaces and mantels embrace a wide and varied assortment, and are intended to meet all reasonable requirements.

Catalogue of Work Benches.

Hammacher, Schlemmer & Co., Fourth avenue and Thirteenth street, New York City, have just distributed some interesting catalogues, relating to work benches and Quick Acting Clamps, which contain a great deal of information likely to appeal to those having use for devices of the character indicated. The work benches in question are intended more especially for cabinet makers, manual training schools and home use, and are of such variety as to meet many requirements. In connection with the illustrations are brief descriptive particulars, together with dimensions and prices, &c., likely to be of interest to the prospective purchaser. The catalogue relating to Quick Acting Clamps illustrates and describes the Colt's series, which have established an enviable reputation in the trade, and for which strong claims are made. Special attention is directed to the improved movable jaw, with has been copyrighted and, in addition, separately, about 400 illustrations and much of the text have been copyrighted.

TRADE NOTES.

AT THE RECENT ANNUAL MEETING of the stockholders of the Joseph Dixon Crucible Company, Jersey City, N. J., the old board, consisting of Geo. T. Smith, William Murray, William H. Corbin, Edward L. Young, Geo. E. Long, William G. Bumsted and Harry Dailey, was unanimously re-elected. The Board of Directors re-elected the former officers, namely, Geo. T. Smith, president; William H. Corbin, vice-president; Geo. E. Long, treasurer; Harry Dailey, secretary. William H. Corbin was also re-elected as counsel.

THE CANTON ART METAL COMPANY, formerly the Canton Steel Roofing Company, Canton, Ohio, calls attention to its new construction of metal ceilings, which it is now prepared to furnish in all its designs of metal ceilings. Realizing the difficulty of erecting metal ceilings, a decided departure has been made in the mechanical construction, in that all ceilings have the nail holes punched through the metal, thus enabling the ceiling erector to drive his nails directly to the furring strips without incurring the delay of first perforating the metal, which consumes considerable time, and which often in driving the nail home meant injured fingers and smashed beads.

THE ELLER MFG. COMPANY is now located in its spacious new quarters at 29 to 37 Lexington avenue, Borough of Manhattan, New York, where it occupies the entire building. Here it has a well equipped plant for conducting its large and growing business in metal ceilings, siding, roofing, &c.

THE BELDEN MACHINE COMPANY, 18 Tryon street, New Haven, Conn., is directing attention to a line of slaters' tools, which will be found of especial interest to those having occasion to put on slate roofs. The tools have leather handles, which are claimed to be practically indestructible, and the hammers are perfectly balanced and finely finished. The point is made by the company that the tools are guaranteed, and are drop forged of special tool steel. They are sold separately or in sets, a set consisting of a hammer, a ripper, a stake and a punch.

BLANC STAINLESS CEMENT COMPANY, Allentown, Pa., and with New York City office at 5 West Thirty-first street, has issued a very attractive pamphlet relating to Blanc stainless cement in stucco, numerous half-tone illustrations showing some of the work in connection with which this material has been used. "Blanc" stucco, it is pointed out, is rarely a coat over 1 in. thick, is very effective against fire and water, is inexpensive, can be colored to suit the taste, and can be molded into any form or ornament according to requirements. In addition to much interesting information regarding new adaptations of "Blanc"—the white Portland cement—lists are given of some of the many buildings in connection with which the material has been used; also the names and addresses of the architects and contractors connected with the work.

ECK DYNAMO & MOTOR COMPANY, Belleville, N. J., is distributing a sectional catalogue and data book relating to various types of direct current motors for lighting and power purposes, which is likely to interest builders operating small shops, as well as those running woodworking establishments where electricity may be employed as a motive power for the equipment. The inclosed type of motor is referred to as specially adapted for use on outside portable hoists, in woodworking establishments, in marble works or stone yards, and, in fact, wherever protection from the various elements that enter into the different industries must be considered.

THE GENERAL FIREPROOFING COMPANY, Youngstown, Ohio, has issued an interesting catalogue of 47 pages measuring 6 x 9 in., and relating to concrete reinforcing material in the shape of steel bars, expanded metal and wire fabric reinforcement. The goods are illustrated in a number of styles, and the book contains some interesting views of construction work in which the company's material has been utilized. Some useful tables relating to the use of steel and concrete reinforcing are given, together with data on wire fabric reinforcing.

THE STAR EXPANSION BOLT COMPANY, 147 Cedar street, New York City, has established a Southern sales agency with D. S. Miller, 1023 Maison Blanche Building, New Orleans, La., where a complete stock will be maintained of the company's line of expansion bolts, screw anchors, toggle bolts, cable hangers, enameled bridle rings, drill holders, and brick and stone drills. This arrangement is made with the object of giving prompt and satisfactory service and effecting a saving on behalf of users of the company's products in the South of time and freight charges.

GEORGE H. BISHOP & CO., makers of high grade saws, Lawrenceburg, Ind., is sending out to its friends in the trade a poster of liberal proportions bearing the request, "Please Tack Me Up." The poster is profusely illustrated with a few of the company's original patterns of handy saws, patented and hand saws of popular styles. In connection with each illustration is given the dimensions, prices of the different sizes and brief descriptive particulars covering the salient features. The poster is well adapted for display purposes.

THE NEY MFG. COMPANY, Canton, Ohio, has brought out a hinge hanger, which is referred to as exceedingly durable and as embodying features which render it one of the best hinge barn door hangers at present on the market. Builders who are interested can secure a circular relating to the hinge by addressing the company.

GORDON, VAN-TINE COMPANY, Davenport, Iowa, is distributing among contractor builders all over the country a catalogue printed in colors and profusely illustrated, in which the statement is made that the present is an excellent opportunity to "buy all building material at a great saving." The catalogue is designated as "Gordon Van-Tine's spring bombardment of bargains," and is issued for the purpose of quoting to hundreds of thousands of people "the lowest prices ever known in building materials." Brief descriptive particulars are given in connection with the goods shown, also prices and dimensions so that the builder receiving a copy of the catalogue can judge of the goods which the company is offering. One of the features referred to is a Modern Book of Plans comprising dwellings, barns, farm buildings, ice houses, &c.

THE SHARON HARDWARE MFG. COMPANY, Sharon, Pa., is distributing among its friends in the trade a very attractive booklet of a size convenient to carry in the pocket and devoted to the company's line of barn and warehouse door hangers. These embrace such a variety as to adapt the goods to meet many requirements, and the illustrations are accompanied by such descriptive particulars as to render the salient features of construction and operation readily apparent. Builders and contractors who may be interested can secure a copy of the little work on application to the company.

L. M. HILDRETH, 514 Elm street, New Haven, Conn., has issued a circular containing some very interesting information relative to the Hildreth Hand Scraper, among which mention is made of the claims to superiority for this tool. The maker is meeting a very gratifying demand for it, orders having been received from territory covering an area all the way from Canada to Florida and from Newfoundland to Honolulu. Those of our readers who are interested in scrapers of this description can secure a copy of the circular on application to Mr. Hildreth.

THE SAMSON CORDAGE WORKS, Boston, Mass., in commemoration of its twenty-fifth birthday, are distributing an appropriate medal struck from white metal and bearing upon one side a representation of Samson breaking the jaws of a lion, while the obverse carries an embossed representation of a loop of braided cord encircling the dates 1884 and 1909. Outside of the loop of cord are the words, "Samson Cordage Works," and "quarter century." The card upon which the medal is mounted states that in 1870 James P. Tolman entered the braided cord business, and that in 1884 J. P. Tolman & Co. established the Samson Cordage Works. In 1888 the latter were incorporated under the laws of Massachusetts, with James P. Tolman, president, and Herbert G. Pratt, treasurer.

A METAL THRESHOLD, designed to be air tight and to protect from the insanitary and annoying dust, noise, odors, air or drafts that come through the usual space between floors and doors, has been put on the market by the Pittsburgh Air Tight Metal Door Sill Company, Liberty and Third avenues, Pittsburgh, Pa. It is slotted in the center to provide for the insertion of rubber tubing which projects slightly above the slot to make an air tight connection with the door. The tubing may be replaced from time to time when it becomes worn, but with high grade rubber the wearing will be very slow. The thresholds are made in all hardware finishes.

Carpentry and Building

PUBLISHED MONTHLY

To all parts United States and Mexico, ... $1.00 Per Year
To all other Countries, ... 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES

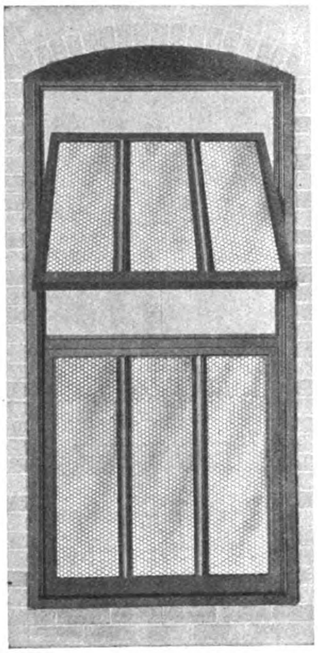
NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS .... 14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager...Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........ Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........ Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........ Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........ Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........ The Cuyahoga, 311 Superior Street

ENTERED AT THE POST OFFICE NEW YORK AS SECOND-CLASS MATTER

NOVELTIES.

The Reister & Thesmacher Fireproof Window.

We present in Fig. 1 of the illustrations a general view of the fireproof window which is being offered the trade by the Reister & Thesmacher Company, 1520 West Twenty-fifth street, Cleveland, Ohio. Before entering the general market, the company has had its windows subjected to the test in the laboratories of the National Board of Fire Underwriters and the privilege to use its labels as a guarantee of excellence. Now 50,000 sq. ft. of floor and yard space with special machinery are devoted to the manufacture of fireproof windows and doors. The illustration shows one of the R. & T. metal window



Novelties.—Fig. 1.—The R. & T. Fireproof Window with Stationary and Pivoted Sash.

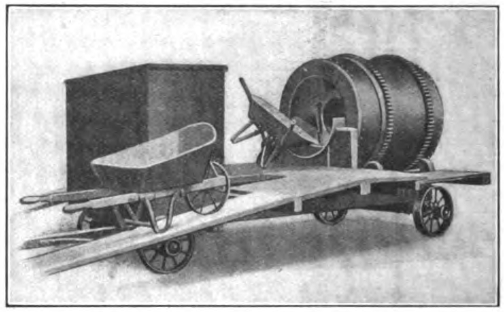
frames equipped with a stationary lower sash and pivoted upper sash, such as is adapted for use in manufacturing plants and warehouses. These windows work easily, and a small pull on the confining chain will open or close them tight. The windows are made with an all stationary sash, with sash for raising and lowering, with counterbalancing sashes, with both sashes pivoted or one stationary, as shown in the picture. The windows are of weatherproof construction and are fitted with "Sure Shot" lock hardware. With the Sure Shot pivoted top and bottom lock there is no rebound, as the lock catches at once and holds securely whether the window falls shut from having been opened an inch or two or its full width. Both the lock at the top and the bottom open with the same pull on the chain that opens the window. Full particulars in reference to these windows are contained in a catalogue issued by the company, which will be sent on application.

Wood Carvings, Moldings and Rosettes.

One of the most attractive catalogues relating to the class of goods indicated by the above title which it has been our privilege to examine this season is the handsome 189-page volume just sent out by the Waddell Mfg. Company, Grand Rapids, Mich., and designated as "Catalogue No. 21." The size of the work is such as to permit the use of a number of illustrations to a page, each design being designated by a figure, which enables the architect or contractor to readily specify what he requires. The goods for the most part are illustrated by means of half-tone views, which appear in light colors upon a deep black ground, thus bringing out the details of each design in strong relief. Special reference is made to the hand carved work, which is illustrated; also to embossed moldings, rope and twist turnings, balusters, newel posts, claw feet for tables, grotesque heads, &c. There are also numerous designs of grill work for interior decoration, and pew ends, all being of a nature to interest the architect and builder. In the make up of the matter brief descriptive particulars are given, together with numbers, sizes, prices, &c. The catalogue concludes with a comprehensive index arranged in such a way as to greatly facilitate reference. The entire work is one which the architect and contractor will find a valuable adjunct to his reference library of trade literature.

The Eclipse Concrete Mixer.

In these days when concrete is being so extensively employed in connection with building operations of all kinds interest naturally attaches to the devices which are used in thoroughly mixing the concrete in its proper proportions. A mixer embodying features of construction likely to command the attention of contractors and builders is shown in the accompanying illustrations. It is the Eclipse concrete mixer, especially prominent novel features of which are the large opening in the drum and the low charging point. The arrangement of parts is such that the material has only to be brought up a short incline by a wheelbarrow, which eliminates the necessity of a charging elevator of any sort and, doing away with such an additional power consuming factor and its frequent necessity of additional attendants.



The Eclipse Concrete Mixer.—Fig. 2.—The Mixer Mounted, Showing General Manner of Discharge.

In Fig. 2 of the illustrations is shown the mixer mounted upon its carriage and the general manner of charging. The material is dumped into the low charging end and is carried into the drums by blades in front, which extend in 8 to 10 in. In spite of the large opening a considerable quantity of material can be charged without any of it falling out, because the blades in the drum are inclined so as to continually throw it toward the center. At the center is a V-shaped plow, which throws the material to the sides, where it is again acted upon by the blades and returned to be divided by the plow. This action of the plow and blades combined with the revolving of the drum effectively and thoroughly mixes the material in a very short time. The manufacturer, the Standard Scale & Supply Company, Pittsburgh, Pa., states that the drum is made of steel and surrounded by two gear bands provided with flares for the supporting wheels. The latter, four in number, take the weight of the drum, and the power for revolving is supplied by two gear wheels on one shaft meshing with the gear bands. Power is applied to this shaft from an electric motor or gasoline or steam engine, as may be most convenient. A gasoline engine is generally preferred as being the least expensive and most convenient under ordinary conditions. When the concrete is thoroughly

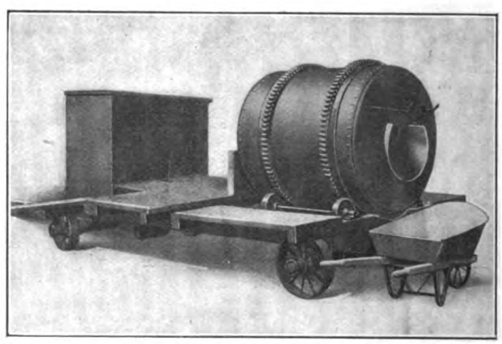
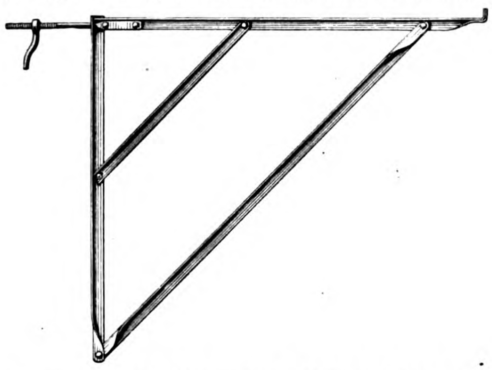


Fig. 3.—The Discharging Side of the Mixer.

mixed it is discharged by opening the discharge chute, which is operated by a handle at either end of the drum. The chute is ordinarily kept covered by a door operated by this lever. The discharge is rapid and relatively high, so that the concrete can be loaded into wheelbarrows, as indicated in Fig. 3 of the illustrations, which represents the discharging side of the mixer. It is claimed that by the combination of low charging and high and rapid discharging the mixer is capable of making as many as 75 complete finished batches of concrete in an hour. The statement is made that a record of one batch every 45 sec. was obtained in connection with street work in the city of Chicago. The outfit as shown can be mounted on a truck, so that it may be easily hauled from point to point by a horse, enabling the contractor to work on more than one job at a time. Ordinarily the mixer is mounted to discharge at the rear end of the truck, as shown in Fig. 3, which is an advantage when used for street or sidewalk construction. It can, however, be mounted to discharge on one side of the truck if desired. The mixer is made in five sizes, the power required ranging from 2½ to 10 hp., and having a batch capacity of 7 to 30 cu. ft. each, respectively, or an output of 10 to 36 cu. yd. of concrete per hour, respectively.



Novelties.—Fig. 4.—A New Folding Steel Builder's Bracket.

A New Folding Steel Builder's Bracket.

A builder's bracket made entirely of steel, angle iron and rivets, and so put together that it may be readily folded so as to occupy a small space and be readily carried about, has just been placed on the market by the Berlin Construction Company, Berlin, Conn. In this building bracket, a side view of which is presented in Fig. 4 of the engravings, there are no bolts to work loose and only one nut —the end nut—for the purpose of attaching the bracket to the building. Theclaim is made by the company that the bracket cannot possibly fold up while in use, owing to the fact that the outer brace is riveted at both ends, while the inner brace is riveted at the upper end and locks over the head of a rivet at the lower end bearing upon the inner side of the bracket. In setting up the bracket the bolt which is riveted at the inner end of the upper arm is passed through a hole in the inner side of the bracket and then through the studding, where it is locked tightly in position by use of the end nut, clearly shown in the engraving. Another important advantage pointed out in connection with the bracket lies in the fact that the outer end of the upper arm is bent upward at a right angle in such a way as to prevent the plank of the staging from slipping off the bracket, as occasionally occurs in connection with wooden brackets. Emphasis is land upon the fact that the bracket here shown is practically indestructible and folds so completely that a sufficient number of brackets for a job can be carried in a light wagon, while half a dozen can be carried under a man's arm. The maker states that it costs no more than a wooden bracket and that its weight is about 15 lb.

A New Adjustable Floor Scraper.

The machine illustrated in Fig. 5 has been developed and recently put on the market by the Long Distance Telephone Mfg. Company, South Bend, Ind., as a product supplementary to its regular line of telephone equipment. Aside from its simple and durable construction, the particular feature of merit claimed for the scraper is the liberal provision made for adjustability of its several parts to varying requirements of service. The construction is such that the handle may be raised and lowered and held at any desired angle by means of a thumb nut bolt passing through the rear extension arms and handle and clamping the latter on solid iron wheels fitted without rubber cushion tires, which hold without slipping or marring the floor. A sliding weight of 50 lb. presses the blade against the floor, and the depth of cut is regulated by sliding it forward or backward on the carriage. Uniform pressure is thus secured without dependence upon tilting of the handle. The degrees of adjustment, ranging from 15 to 50 lb. in weight, are indicated by a scale on the side of the frame. The most important adjustment is that which regulates the cutting angle of the blades. This is controlled by blade clamps composed of two semicircular parts held in grooved bearings, which allow the blade to be set at any required pitch. The clamp head is also capable of lateral adjustment necessary to give a bias or shear cut. The machine is built to accommodate cutting blades 4½ in. deep, with a cutting edge of 5 in., and weighs 125 lb.

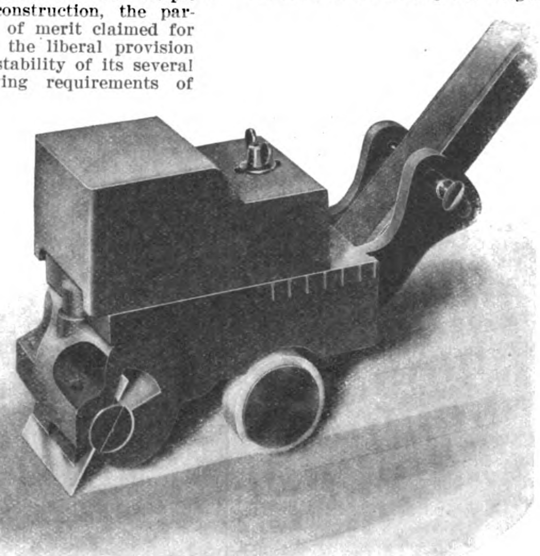


Fig. 5.—A New Adjustable Floor Scraper.

Disston's Pocket Size Catalogue.

We have received from Henry Disston & Sons, Inc., Philadelphia, Pa., a copy of the pocket size reproduction of their large catalogue of saws, trowels, knives, machinists' tools, bevels, squares, gauges, screwdrivers, &c., which is issued in most attractive form. The illustrations are numerous and in connection with them are brief descriptive particulars, as well as numbers, sizes, prices, &c. In presenting the price-list, as it is called, special attention is directed to the new goods added and to the regulation in prices of some standard articles, the merits of which are well known to the trade. As long ago as 54 years, the manufacturers state, they recognized the importance of making their own steel in order to obtain satisfactory quality and at that time established the first plant in America for making crucible saw steel. Since then the plant has been enlarged and improved until now it is referred to as among the largest and best of its kind making high grade crucible steel, peculiarly adapted for saw and tool purposes. A second catalogue of the same general style and make up of the first is devoted to what may be described as "mill goods," being those intended for use in connection with sawmills. These goods embrace circular, band and cross cut saws, shown in a great variety of styles and sizes; saw teeth of various kinds, gummers, grinders, rendering the operation of the machine extremely easy. The motor is behind the machine out of the way, and occupies, it is claimed, no space that would be otherwise useful, being beneath the overhanging table. The machine can be located in any position desired, being independent of line shafts. The claim is made that a minimum amount of power is wasted, there being nothing consumed by extra belts, countershafts, &c. It is to be noted that a saw of this kind only operates intermittently, and the absence of a main shaft and countershaft is thus particularly advantageous, since power is used only when work is actually being done. Altogether this arrangement constitutes an interesting example of the advantages of the motor drive in connection with machines for woodworking establishments, contractors' shops, &c.

U-Bar Greenhouses.

One of the most interesting and attractive publications relating to greenhouse construction which it has been our privilege to examine is the first section of advance sheets from the new catalogue just issued from the press by the Pierson U-Bar Company, designers and builders of U-Bar greenhouses, Metropolitan Building, Fourth avenue and Twenty-third street, New York City. This first section consists of 64 pages, profusely illustrated by means of excellent halftone engravings of conservatories and greenhouses, accompanied by plans and descriptive particulars, bound in rather stiff paper covers. The work illustrated covers a wide range, thus making the catalogue of special interest to an extended clientele. The designs are exceedingly attractive from an architectural as well as from a constructional point of view, the treatment of what may be termed the "workroom" being in many cases exceptionally clever. Naturally the first thing to which the attention of the reader is invited is the "U-Bar" construction, the merits and advantages of which are pointed out in a way to interest the architect, the contractor and the house owner. Three sizes of the U-Bar are used in the company's various work. In the U-Bar construction a cypress core bar is encased with a galvanized steel U-Bar, the combination members being no larger, it is stated, than the smallest wooden sash bar used in other constructions. Owing to the great strength of the steel U-bars the company is enabled to eliminate the heavy iron rafters and many lateral supporting members; also to place the bars further apart, permitting the use of glass 24 in. wide, while by bending the bars at the eaves line and using curved glass at this point all cumbersome gutters, plates, posts and other shading members are also eliminated, resulting, it is pointed out, in a structure of extreme lightness. Another point to which attention is directed is that the steel U-bar casing of the cypress core bars eliminates interior woodwork, with its tendency to decay, while the galvanizing of all steel members prevents rusting. The method of bedding the glass insures tightness, and the aluminum interior finish reduces repainting to a minimum, while all combine to produce a structure of great durability and low cost of maintenance. The company points out that the U-bar greenhouses are made by highly skilled workmen in a modern factory equipped with special machinery for turning out all parts of the houses excepting only the glass. Everything is shaped, cut and fitted at the factory ready for immediate erection when it reaches the building site. Men thoroughly trained in all branches of the work are sent to put the parts together, these men being directed in turn by experienced superintendents, all of which insures first class workmanship. In the catalogue under review the simplest kind of a house that it is really practical to build is first illustrated, and this in turn is followed by designs of gradually increasing size until the larger schemes are shown fully developed. In case the catalogue subjects do not meet the requirements of the prospective customer the company will make special plans for his approval. As intimated at the outset, the work is excellent in its arrangement and cannot fail to prove of great value to those having to do with the designing, erection and use of greenhouses.

Concrete Buildings and Other Construction.

A pamphlet carrying the above title and the idea of its publication being suggested by the discussion arising from the appointment by the Mayor of a committee to recodify the building laws of Denver is being distributed by the Portland Cement Company, Denver, Colo. It briefly describes the merits of the different kinds of office and factory buildings; devotes about 30 pages to the recommendations of the joint committee of the various national associations interested, which is a valuable synopsis of the present knowledge of the subject, and shows plainly that the hight of reinforced concrete buildings should not be arbitrarily limited, but be governed, as are steel buildings, by the size and strength of the members. It also has chapters on the relative resistance to fire of cement, stone and brick buildings, showing the advantages of the former; on sewer pipe, showing the superiority of cement pipe; on cement street paving and cement shingles.

Thin Steel Knives for Surfacing Lumber.

A proposition that comes to the mind of every progressive lumberman at this time is whether or not to use thin steel knives in connection with the planing and surfacing of lumber. Some advocate the use of a square head with thin knife and spring steel back, while others purchase complete heads especially suited to the use of the thin steel knife, but it matters little which of the methods in vogue may be adopted, because all show advanced ideas for the surfacing of lumber. There is, however, one point of peculiar interest, and that is relative to the kind of thin steel knives one adopts. Many makes of these knives may be found with varying degrees of merit, but those which are especially useful and making particular claim to superiority are the Bedee knives, manufactured by Samuel J. Shimer & Sons, Milton, Pa., to whose product this journal has frequently referred in the past 30 years.

TRADE NOTES.

M. L. CURBY COMPANY, Brighton, Mich., refers to its double reversible level as one of the handiest tools which the carpenter can place in his "kit." It is in reality two levels in one, and is offered in lengths of 26 and 28 in. by 3¼ by 1¼ in. It is of first-class construction and is guaranteed in all respects.

IN referring last month to some of the more important contracts recently completed by the Ironton Portland Cement Company, Ironton, Ohio, the omission of a cipher in connection with the contract with the N. & W. Railroad made the number of barrels of cement used read 20,000, whereas it should have been 200,000 barrels. Those who have used the "Limestone Brand" of cement made by this company refer in very flattering terms to its merits, and attention is called to its use in the construction of the reinforced concrete floors of the Public School Building in Ironton, where there was a clear span of 22 ft. 6 in. A test of the cement used in this building was the casting of a block of concrete without reinforcement 4 ft. x 18 in. x 36 in. composed of a mixture of 1:2:6. The statement is made that at the end of 30 days it carried a load of upward of 900 lb. per square foot without the slightest sign of failure or deflection.

THE ACME METAL CEILING COMPANY, 2295 Second avenue, Manhattan, N. Y., has recently opened branch offices and shops at 871 Flushing avenue, Brooklyn, N. Y. Ample stocks will be carried so as to more promptly meet the requirements of the company's trade in Kings County.

THE RICHARDS MFG. COMPANY, Aurora, Ill., sends out a series of leaflets calling attention to its leading specialties, prominent among which are the Richards Royal house door hanger, which is referred to as being perfectly noiseless, and Richards no-jump barn door hanger with roller bearing. The point is made that the wheel is hung on a pivot and adapts itself to any unevenness of track by automatically raising or dropping. It is made with one and two wheels, according to requirements. A calendar for the month is included in the package, and carries the statement "We are authority on the door hanger question."

THE RAYMOND CONCRETE PILE COMPANY, New York and Chicago, Ill., has secured the contract for placing about 700 Raymond concrete piles in the foundations of the new high school building on North Washington street, Wilkes-Barre, Pa. Owen McGlynn is the architect of the building and the Sax & Abbot Construction Company, Philadelphia, Pa., the general contractors.

Carpentry and Building

PUBLISHED MONTHLY

To all parts United States and Mexico, ... $1.00 Per Year
To all other Countries, ... 1.25 Per Year

Advertising Rates on Application.

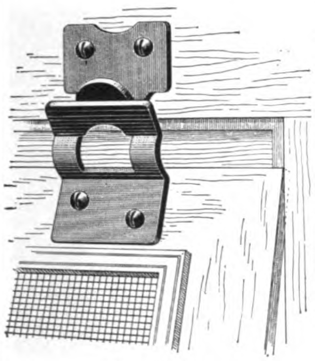
BUSINESS OFFICES

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHER .... 14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager...Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........ Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........ Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........ Fisher Building, Dearborn and Van Buren Streets
CINCINNATI—HENRY SMITH, Manager........ Pickering Building, Fifth and Main Streets
CLEVELAND—EZRA S. ADAMS, Manager........ The Cuyahoga, 216 Superior Avenue, N. E.

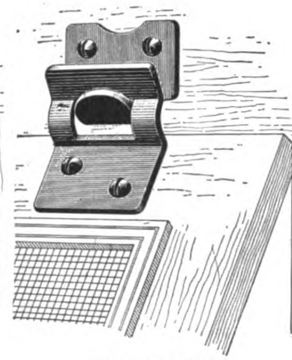
ENTERED AT THE POST OFFICE NEW YORK AS SECOND-CLASS MATTER.

WE INITIATE—NEVER IMITATE

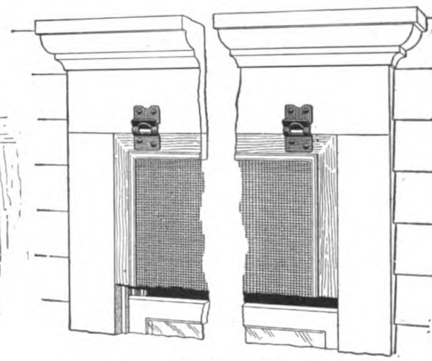
Automatic Screen and Storm Sash Hangers



First Position



Second Position



Third Position

Here it is at last. A Practical Screen and Storm Sash Hanger.
It is so constructed that it holds sash or screen firmly in position and prevents Rattling.
When rehanging screens or storm sash let top rest against blind stop inside of casing. (Illustration No. 1.) Slide up and Hanger will latch over hook automatically. (Illustration No. 2.)

They are sure "winners." Send 15 cents in stamps for sample set with screws, mailed post-paid with full directions for hanging.

NATIONAL MFG. CO. - - - - - Sterling, Ill.

TOOLS

We list below the titles of several little catalogs we issue, each complete in itself, which we distribute free to those interested. These are handy booklets and will be found very convenient to the tool buyer. Simply mention the number—you can have one or all.

No. 2655 Hand Screws and Clamps
" 2656 Mitre Boxes
" 2657 Files and Rasps
" 2658 Saws
" 2659 Planes
" 2660 Yankee Tools
" 2661 Automatic Mitre Clamp
" 2662 Peugeot Aine French Band Saws
" 2663 Genuine S. J. Addis Carving Tools
" 2664 Colt's Quick Action Clamps
" 2665 Pyko Tool Grinders
" 2666 Jorgensen Adjustable Hand Screws
" 2667 Work Benches

Remember, we have been selling tools since 1848 and our hobby has always been *quality*. If you want a new outfit or only a few additional tools, let us figure with you. We will try to make it interesting.

HAMMACHER, SCHLEMMER & CO.

Hardware Tools and Supplies

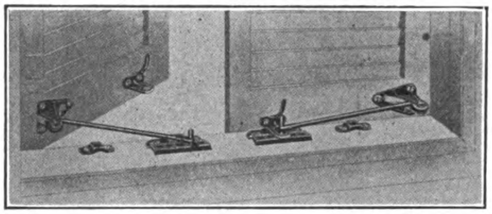
NEW YORK SINCE 1848

4th Avenue and 13th Street

NOVELTIES.

Zimmerman's Shutter Fasteners.

In the new style of shutter fastener which Harry Zimmerman & Co., Fremont, Ohio, are introducing to the attention of the trade the strongest feature is the elimination of the right and left problem. The brace rods are interchangeable for either a right or left hand shutter, this being accomplished by riveting to the end of the brace rod a T-shaped cross head, the



Novelties.—Zimmerman's Improved Fasteners.—Fig. 1.—Showing Application to Shutters.

ends of which are pear shaped and cannot jump from the sill plates. The latter are also interchangeable, and the point is made that they cannot be put on backwards. A general view of the application of the improved shutter fasteners is presented in Fig. 1 of the engravings, while in Fig. 2 is a view of the T-shaped cross head referred to. The fasteners are also

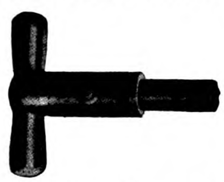


Fig. 2.—The T-Shaped Cross Head Which Is Riveted to the Brace Rod.

adapted for use in connection with casement windows, in which case the sill plates are countersunk, so that the surface of the sill plate is flush with that of the sill. The application of the fasteners in connection with casement windows is shown in Fig. 3. All parts of the fasteners are made of heavy pressed steel, which, it is claimed, not only makes an exceptionally strong finish, but also gives a

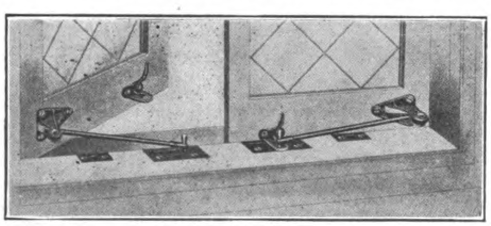


Fig. 3.—The Fasteners Used on Casement Windows.

smooth surface for plating, making possible a much neater looking article than the old style cast iron affair. The firm makes announcement of the fact that it manufactures the solid copper and solid brass goods, and that any desired finish can be made to order.

What Cornell University Thinks of the Yale & Towne Works.

A student of Sibley College, Cornell University, inquiring as to how much credit he would obtain for shop work done during the vacation, was told that it was the practice to give one hour's credit for every two hours devoted to actual work in a shop or foundry, provided the latter were approved by the faculty as a proper place for gaining useful experience. Asking if the Yale & Towne Works at Stamford, Conn., would fit this description, he was informed that double credit would be given for any time spent in these works, as, in the opinion of the faculty, it was the full equivalent of the instruction given at the college, and that in this respect it ranked with a very few of the leading industries of the United States.

Gasoline Engines for Small Woodworking Shops.

Much has been written concerning the use of small power in woodworking shops of carpenter contractors where frequently only a comparatively few machines are installed and the operation of which is intermittent, but the subject has by no means been exhausted, and reference to it is made with recurring frequency in the trade press. Various forms of power have from time to time been advocated, the merits of each being set forth in a style to arrest the attention of the proprietor of the shop, but it is generally conceded that, other things being equal, the gas or gasoline engine is particularly well adapted for the purpose mentioned. Where gas is not readily available the gasoline engine offers exceptional advantages in the way of convenience and economy of operation. It is easily started when power is wanted, and as soon as the work in hand is completed its operation may be instantly stopped, with a resultant cessation of fuel consumption, thus reducing the cost of the power to a minimum. Carpenters and builders having occasion to operate a few machines in connection with their shops will find a 2 hp. or 3 hp. gasoline engine a very convenient means of supplying the small amount of power required. The claim is made that a 3-hp. engine is sufficient to run a variety of small machinery and do a surprising amount of work with a minimum of trouble to handle and expense to operate. Among engines of this type it may not be without interest to mention the 3-hp. motor made by the White Lily Mfg. Company, Davenport, Iowa, and which is claimed to be superior in point of "convenience, simplicity and economy." It is an air cooled, four-cycle gasoline engine, occupies a floor space 18 x 22 in., weighs 375 lb., and is said to produce a uniform speed in the flywheel of 550 rev. per min. Being automatically governed, it adjusts the consumption of gasoline to the load which it is operating, cutting it down to the lowest possible point, and being air cooled, the claim is made it can be left all times of the year in a shop or out of doors without serious danger of damage. By reason of its light weight and the fact that a foundation is unnecessary, the engine can be taken from the shop and used on any job desired.

The "Little Shaver" Portable Saw Rig.

At the present day one of the principal problems the carpenter contractor who would be successful in his business has to consider, is the best way of executing his work in the most efficient manner and at a minimum of cost. It is well known that methods of doing work vary so widely that un-

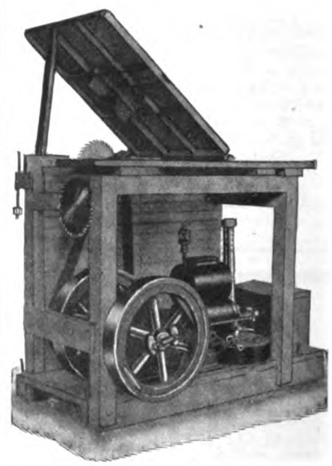


Fig. 4.—The "Little Shaver" Portable Saw Rig.

der practically the same conditions one contractor will execute his work in such a way as to show a profit, while another will find the balance on the wrong side of the ledger. Many contractors are able to carry work through with much less expense than others, all due to their system of management and the use of improved labor saving machines. With a view to saving the contractor much waste of time and labor which is overlooked when figures on a job are submitted, the General Mfg. Company, 129 Michigan street, Milwaukee, Wis., has placed upon the market what is known as the "Little Shaver" Portable Saw Rig, illustrated in Fig. 4 of the engravings. The claim is made that this outfit is so constructed that the contractor can do a great deal of the mill work directly at the job and do it quickly at very small cost. The iron table is fitted with gauges which enables cross cutting, rip sawing, mitering, &c.

The entire length of the table is 42 in. and the width 27 in., with an adjustable screw under it, so that the table may be raised or lowered according to requirements. The claim is made that the saw rig will do on the job all of the sawing now generally done by hand, such as sheathing boards, flooring, siding, &c. The main feature of the rig is said to be the total absence of vibration, this being very important where fine work is to be done. The engine furnished with the outfit and shown in the illustration is specially built for this kind of a rig. It has a belt tightener attachment which keeps the belt from getting loose and can be adjusted in a few minutes. The engine is water hopper cooled, and will, it is claimed, develop 3 hp. under continuous brake test, which gives an abundance of power to run the saw. With each outfit is furnished two saws—a rip and a cross cut—a dado head for plowing window and door frames, an emery

Novelties.—The Standard Boring Machine. —Fig. 5.—The No. 1 Machine for Overhead Boring.

wheel for sharpening tools, a belt tightener, wrenches, &c. The rig is strongly built, and the claim is made that three men can lift it on and off a wagon, thus making it an easy matter in moving from job to job.

The Standard Boring Machine.

The Ford Auger Bit Company, Holyoke, Mass., is putting on the market a boring machine particularly designed for the use of electricians and shown in one of its various applications herewith. The machine is made with various modifications to adapt it to special uses. No. 1 in Fig. 5 represents the machine made with two tempered steel tubes. It can be quickly adjusted to any hight. The sprockets and chain, Fig. 6, are of the well-known bicycle construction. The machine will work in narrow spaces, it being less than 3 in. from front to rear, and any length bit can be used. The machine has handles that can be adjusted to any position, and is operated by pulling down, first with one hand, and then with the other. The internal ratchets have bronze bearings to make them durable. In the below-boring fixture, for work in old houses or buildings, the head shown in Fig. 6 is used, this being the same head as on the overhead machine, No. 1. In Fig. 7 is shown the base partition machine, which does away with the necessity of tearing off baseboards. The wiring may be done without injuring anything. The bit may be inserted so as to bore in the opposite direction from that shown in the illustration.

Steel Ceiling Catalogue.

Progressiveness of the architectural sheet metal industry in the Southwest is exemplified in the new steel ceiling catalogue No. 300 being distributed to the trade by the W. F. Norman Sheet Metal Mfg. Company, Nevada, Mo. This book, 11 x 14 in., 64 pages, is filled with handsome illustrations of latest designs in ceiling and side wall patterns, with accessory moldings, panels and finishes comprising the High Art series contained in the company's output. An introductory chapter, with illustrations, gives instructions for applying High Art steel ceilings and describes the manner of placing the furring strips to which the ceiling plates are fastened. The ceiling pattern illustrations show a wide variety of tasteful and artistic designs in Greek, Rococo, Empire, Oriental and Colonial, as well as modern styles. Recent improvements in the way of new equipment are about to be supplemented by an addition to the plant of a two-story building, 88 x 150 ft., a suitable site for which has just been acquired.

Koll's Staved and Turned Columns.

We have just received from the Hartmann-Sanders Company, Elston and Webster avenues, Chicago, Ill., a copy of its price-list and catalogue No. 40 for the season of 1909. It is an attractively printed publication of 48 pages and illustrates and describes various styles of Koll's patent lock joint staved and turned columns. Diagrams are presented showing the manner in which the columns are made, together with half-tone illustrations of some important buildings in connection with which the columns have been used. Numerous tables are scattered through the catalogue giving diameters, lengths and prices of the various styles of columns illustrated. The company states that its factory contains over 40,000 sq. ft. of floor space, equipped with modern machinery of special design, and that it is in a position to furnish columns "that are absolutely correct, both architecturally and mechanically, in the shortest possible time." A modern dry kiln with 600,000 ft. capacity insures the proper seasoning of all lumber entering into the construction of the company's product. The prices given in the catalogue are based on a specially selected grade of white pine for exterior work as a standard The company states that it makes no extra charges for turning columns to specified detail, but in the absence of such detail the columns are made to conform accurately to the usual orders of architecture, as shown by the various illustrations in the catalogue. The company makes the announcement that it has in operation a complete plant for the manufacture of composition column and pilaster caps, thus permitting the filling of all orders with accuracy and dispatch.

Hydro-Pneumatics as Applied to Water Supply Systems.

A handbook which is likely to be of interest to architects, contractors, plumbers, pump men, &c., has just been issued under the above title by the Leader Iron Works, Decatur, Ill., and with New York office at 15 William street. It is a work of 52 pages, measuring 3¾ x 9 in. in size, thus

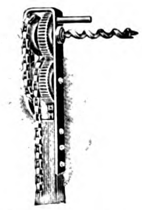


Fig. 6.—Sprocket and Chain Used on Machine No. 1.

rendering it convenient to carry in the pocket or keep conveniently at hand in the pigeonhole of a desk. It is written by a practical man, and is of technical interest to every one connected with the installation of pneumatic water supply systems. Some of the leading topics discussed are the importance of a proper supply of air, Leader Hydro-Pneumatic tanks, designing the plant, the question of power, and the installation of the plant. The illustrations are presented in the shape of lettered drawings giving the pipe size and details necessary for the proper installation of a plant. The Leader Iron Works have been to considerable expense in preparing the book, which they state is neither a catalogue nor a strictly advertising proposition, but they are willing to send a copy to any one in the trade who may desire it on receipt of 6 cents in stamps to cover the cost of postage.

Vulcanite Roofing.

Some very interesting particulars relating to Vulcanite roofing are con-

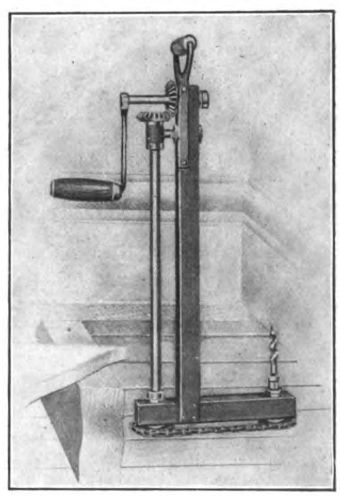
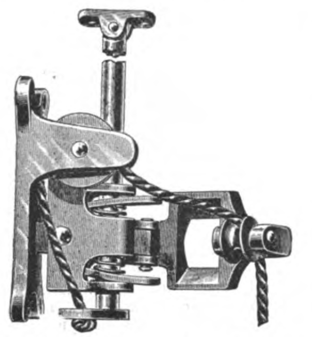


Fig. 7.—Base Partition Machine.

tained in an illustrated pamphlet sent out to the trade by the Patent Vulcanite Roofing Company, 625 to 659 South Campbell avenue, Chicago, Ill. The pamphlet is oblong in shape and carries upon its cover a representation of a roll of Vulcanite roofing and bears as a title "A Roll of Information." The story of the roofing is presented in concise form, and numerous half-tone illustrations are given showing buildings in connection with which the roofing has been employed. One of the most striking illustrations is that of a Vulcanite roof laid out as a garden on the pavilion of the Mater Infirmorum Hospital in Belfast, Ireland. In connection with this institution 17 roofs and one large watertank are covered with the material mentioned. Accompanying the pamphlet is a smaller one in which is presented some of the principal advantages of Vulcanite ready roofing, together with specifications and directions for applying. The roofing is put up in rolls containing 108 sq. ft., 40 ft. 6 in. long by 32 in. wide. The extra 8 ft. provide for laps, so that each square of roofing gives a full 100 sq. ft. of finished roof.



Novelties.—The Payson Skylight Operator.—Fig. 8.—General View of Mechanism.

The Payson Skylight Operator.

An ingenious mechanical device for the opening and closing of skylights, recently developed by the Payson Mfg. Company, 1319 Jackson boulevard, Chicago, Ill., is illustrated herewith. The mechanism by which this skylight controller is operated is shown in Fig. 8. Although simple in construction, its successful action is dependent upon a series of successive motions and controls, which are claimed to be positive and effective. By means of this device the skylight is securely locked at any position within the range of opening. When the cord is pulled it brings the saddle or yoke of converging planes inclosing the spring into contact with the clamps that rigidly hold the operating rod; the clamps are thereby caused to release their hold upon the rod and the weight of the skylight is thus transferred to the operating cord as long as the pull continues. A slackening of the cord permits the spring between the clamps to resume control, and the latter being thrown outward, instantly grip and hold the operating rod. The lock is placed upon a pivot carriage, so that the operating rod easily conforms itself to the sweep of the skylight in opening and closing, and is at all angles free to move in its slides, and is firmly gripped when released from the pull of the operating cord. A view of the device in use is shown in Fig. 9. To open, the cord is pulled until the skylight is raised to the desired hight, when the rope is released and the grip of the lock is automatically fastened upon the rod. In closing the skylight the rope is pulled until it supports the weight of the skylight, when a partial slackening of the line permits it to descend with a speed that is always under control. This control, it is stated, is so positive that the rope may be cut when under full strain and the descent of the skylight will be arrected before it has dropped ⅛ in. The skylight operators weigh about 2 lb. each and are packed one-half dozen in a case.

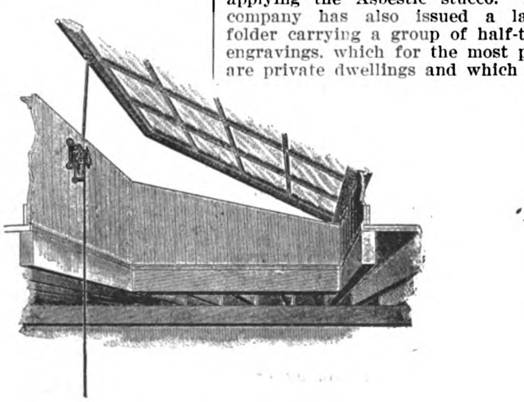


Fig. 9.—The Payson Skylight Operator in Use.

Asbestic Stucco.

The increasing popularity of stucco as an exterior finish for buildings has caused no little attention to be given to the materials used to produce the desired effects. One of the combinations which appears to be meeting with no little success is described as Asbestic stucco, a pure ground asbestos rock containing a large quantity of asbestos fibers and forming in combination with Portland cement a tough fireproof exterior, which it is claimed is not affected by extreme climatic changes, while at the same time it is susceptible of a great variety of texture effects in the surface treatment. This material is being supplied by the H. W. Johns-Manville Company, 100 William street, New York City, and in connection with it is issued specifications for mixing and applying the Asbestic stucco. The company has also issued a large folder carrying a group of half-tone engravings, which for the most part are private dwellings and which are referred to as examples of the superior results obtained by the use of Asbestic stucco.

The Osborne Blind and Transom Adjusters.

Architects and builders are likely to be interested in the exceedingly attractive catalogue illustrating and describing the Osborne blind and transom adjusters, manufactured by the Boston Pressed Metal Company, Worcester, Mass. The transom adjuster is said to be constructed on a principle which is mechanically correct, yet so simple that "years of constant use cannot impair its efficiency." Two ends of a slender, strong chain fall from the adjuster case, and a slight pull on one end opens the transom to any desired position, while a pull on the other end closes the transom. The moving chain running over a sprocket turns a worm and gear, to the shaft of which is keyed the adjusting arm. As the gear cannot move the worm, the arm and hence the transom is automatically and instantly locked the moment the chain ceases to be drawn. The working parts are inclosed in a steel case, which, together with all exposed parts, may be finished to match any style of interior decoration. The catalogue in question is illustrated by means of half-tone engravings showing the application of the transom and blind adjusters, together with some buildings in connection with which the device has been used.

The Pittsburgh Ventilating Sash Lock.

The sash lock illustrated in Fig. 10 is designed for use on any window,

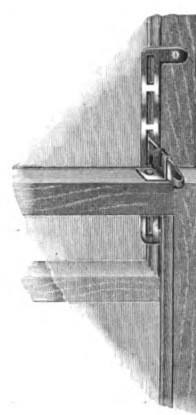


Fig. 10.—The Pittsburgh Ventilating Sash Lock Adapted for Use on Windows with or without Sash Weights.

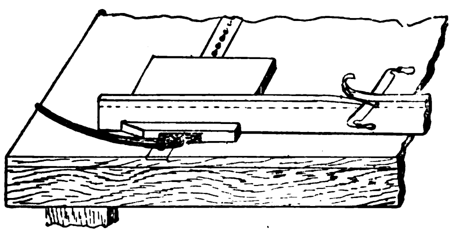
whether equipped with sash weights or not. The bottom sash can be raised or the top sash lowered, or both, securely locking them at the desired hight. The locks are packed with screws, and only a screwdriver is required to put them on windows, no mortising or cutting being required. There are no springs in the construction of the locks, which are made of high grade crucible steel, in antique copper plate, brush brass, nickel and gun metal finishes. The point is made that the strain on lock is lateral, which insures the greatest safety from intrusion. The locks can be easily taken off when tenant moves from one house to another. The lock is manufactured by the Pittsburgh Sash Lock Company, McKees Rocks, Pa.

Flexifold Doors and Partitions.

The Flexifold Door & Shutter Company, 10 East Worcester street, Worcester, Mass., has issued some very interesting circulars descriptive of Flexifold partitions, doors, blinds, ventilating school wardrobes, &c., which it manufactures, adapted to meet varying requirements. While in recent years the company has made no radical changes in the appearance of its doors, it has perfected many of the minor details, so that it now has a door which is not liable to get out of order and gives entire satisfaction in operation. The old type of coiling apparatus was discarged some time ago, and since then the company has been using an apparatus which is operated by a spring and a system of gears that is positive in its action. Stronger and simpler connections are used than was heretofore the case, these being ¼ in. continuous steel connections, each hinge being made with one piece as against the old style two-piece hinge. The company points out that its vertical doors are proving very popular and are being used in churches between Sunday school rooms and auditorium; as well as for separating classrooms; in colleges for subdividing large halls and lecture rooms; in town halls for separating committee rooms; in banquet halls for subdividing smaller rooms, and in stores as fronts to dress goods cases, as well as for the fronts of shelves; for wardrobe fronts in school buildings, and for a great variety of other purposes.

Pullman Automatic Bench Vise.

A bench vise especially adapted for the use of carpenters and cabinet makers, and which is so constructed that it will automatically clamp and hold the work against a forward, backward or transverse movement by simply shoving the work hard between the jaws, is being introduced by the Pullman Mfg. Company, Sophia street, Rochester, N. Y. The claim is made that this is the only vise on the market that will hold the work on top of the bench. It is a great time and labor saving tool, and the claim is made that by its use the average mechanic at ordinary bench work will save time enough in four days to pay for it. The work is released by lifting up the rear end of it. Two sizes of vise are made, one measuring 10 in. between the jaws and the other 20 in. between jaws. The view which we present in Fig. 11 of the illustrations shows the general appearance of the vise, and the manner in which work is held in place by it so clearly that extended comment would seem to be unnecessary.



Novelties.—Fig. 11.—The Pullman Automatic Bench Vise.

TRADE NOTES.

THE MASTIC WALLBOARD & ROOFING MFG. COMPANY, 53 East Third street, Cincinnati, Ohio, points out that the Bishopric wallboard is used as a substitute for sheathing as well as lath and plaster. It is made of kiln dried dressed lath embedded in hot asphalt Mastic and surfaced with sized cardboard. It is cut at the factory in 4 x 4 ft. sheets which can be nailed direct to the studding all ready for painting and papering. The material is suitable for the expensive dwelling as well as the modest cottage, also for bungalows, office and factory buildings, garages, for finishing attics, &c., &c. The company points out that any one sufficiently interested can secure a free sample with descriptive booklet on application. Another specialty of the company is Bishopric roofing, which is composed of "asphalt Mastic and woolen felt surfaced on both sides with flaked mica."

THE PHILADELPHIA & BOSTON FACE BRICK COMPANY, 165 Milk street, Boston, Mass., suggests to those about to build or remodel the home to send for its illustrated catalogue showing many designs of ornamental brick fireplaces. The point is made that these are of such a nature that they are easily set by the local mason making use of the plan furnished by the company.

THE PITTSBURGH METALLIC LATH COMPANY, Tarentum, Pa., has purchased a site on the Allegheny Valley Railroad at Arnold Station and will construct its plant there. The main building will be 200 x 312 ft.

A SUPPLEMENTARY CATALOGUE OF ORNAMENTAL SHEET METAL GOODS of sufficient size and containing ample illustrations to give it the dignity of a main catalogue has been issued by the Friedley-Voshardt Company, 204 Mather street, Chicago. It comprises 80 pages, 10½ x 14 in., the majority of which contain several illustrations of interior or exterior ornamentation pieces. Neatness of design is characteristic of the complicated as well as the simple pieces, and ample opportunity is afforded tne architect for making a suitable selection. The company states it will be glad to forward a copy of the catalogue to any one in the trade desiring it.

ATTRACTIVE iron and wire fences adapted to a great variety of purposes constitute the basis of an interesting catalogue issued by the Enterprise Foundry & Fence Company, 201 South Senate avenue, Indianapolis, Ind. In view of the extent to which material of this kind is used for artistic gateways, railings and boundary divisions, what the company has to offer cannot fail to more than ordinarily interest the architect and builder. A copy of the catalogue will be sent free to any one who may desire it.

THE BERGER MFG. COMPANY, Canton, Ohio, is distributing an exceedingly attractive pamphlet of a size convenient to carry in the pocket relating to Berger's Prong Lock Steel Studs and Furring, with the names and addresses of many who use them. The merits of the product are set forth in the early pages and in a way to appeal strongly to the architect and builder. Practically all the illustrations, which are numerous, relate to buildings in connection with which the company's goods have been used. Among the latter pages reference is made to Berger's Metal Lumber, to Expanded Metal Lath and to Berger's Ferrolithic Steel Plates and Berger's Raydiant Sidewalk Lights.

THE STANLEY RULE & LEVEL COMPANY, New Britain, Conn., has issued from the press a most interesting catalogue which is in effect a mechanics' handbook, showing practically its full line of tools and containing many useful tables. The company manufactures a number of special planes, some of which will be found illustrated in another part of this issue. A copy of the catalogue, which is known as No. 34, will be sent to any carpenter or builder upon request.

THE contract for placing Raymond concrete piles in the six-story reinforced concrete factory building that is being erected for Brewster & Co., carriage builders, at the Queensboro Bridge Plaza, Long Island City, N. Y., has been awarded to the Raymond Concrete Pile Company, 140 Cedar street, New York. Stephenson & Wheeler are the architects of the building and Tucker & Vinton the general contractors.

THE AMERICAN SHEET & TIN PLATE COMPANY, Frick Building, Pittsburgh, Pa., makes the announcement in another part of this issue that the most practical roof "is by all odds a tin roof, and if a tin roof, then it should be made of 'M. F.' roofing tin." The claim is made that it is weatherproof, fireproof, neat in appearance, easily applied, light, and most important of all, is durable.

A TOOL which will strongly appeal to the practical carpenter and builder and one which is referred to as being especially well adapted for cutting rafters and building stairs is the combination square, tri-square, bevel square, plumb, level and bevel protractor which is being introduced to the trade by A. O. Calhoun & Co., Perry, Mo., and illustrated in these columns a few months ago. It is of such construction as to effect a great saving of time and labor in making rapid calculations, and the point is emphasized that it is "accurate and correct in every instance." The figures are plainly indicated, and the graduations are so arranged that they are "automatically found and read at a glance." It is compact and complete in itself, there being nothing to attach or detach.

AN IMPORTANT ANNOUNCEMENT of the Hess Warming & Ventilating Company, 909 Tacoma Building, Chicago, Ill., is to the effect that it will send a Hess Steel Furnace, with complete heating outfit for a 60-day trial free of charge. The outfit will be delivered at the station of the purchaser, freight prepaid, the purchase price to be placed in the hands of the buyer's local banker, who will hold the money 60 days while the heater is under test. In case the test is not satisfactory in every way the goods may be returned to the company at its expense and the banker will refund the money. The company suggests that readers of *Carpentry and Building* who may be interested in the subject of heating send for free booklets and estimate.

THE UNITED STATES STEEL MIXER COMPANY, Inc., 600 Atwood Building, Chicago, Ill., is directing the attention of contracting builders to the Cornwall portable cube mixer which it is manufacturing. The claim is made that its low cost, portability and adaptability to all kinds of work make it a machine which cannot fail to strongly appeal to every builder having to do with the execution of work involving the use of any considerable quantity of concrete. The point is made that no job is too large and none too small for the machine to do its work, and that the methods of measuring and mixing the materials are such as to insure correct proportions and perfect mixing.

THE 1900 FURNACE COMPANY, Youngstown, Ohio, invites building contractors to send for its "trade" offer in connection with the heating apparatus which it is prepared to furnish. This is the season of the year when attention is being given to the question of heating, and what the company has to say cannot fail to prove of interest. A booklet giving full information can be obtained on application to the company.

because the college trade demands it. The machines illustrated and described in the catalogue under review constitute only a few of the great number of tools manufactured by the company, but they are, however, what is deemed the most important ones recommended for training schools. The illustrations are beautifully executed half-tone engravings made directly from photographs of the various tools and machines and show to excellent advantage. In connection with them are sufficient descriptive particulars to give a comprehensive idea of the salient features of each. The catalogue is "dedicated to students and instructors in manual training everywhere."

Brick and Plastering Trowels.

Wiebusch & Hilger, Ltd., 106 Lafayette street, New York City, sole agents for William Rose & Bros.' entire line of brick trowels, most of which are fully warranted, are prepared to furnish a number of new patterns designed especially for laying bricks in cement. This work necessitates especially wide trowels to carry a sufficient quantity of cement which is in a more fluid state than mortar usually is. The special Philadelphia pattern is made with wide and extra wide heel in ten sizes ranging from 9½ x 5½ to 12 x 6½ in., with hardwood handles 5 in. long, and in the same style and sizes with leather handles 5¼ in. long. Rose trowels are made in three weights, all orders being filled with standard weight unless otherwise specified. Limber trowels are made for those who request them; the Norfolk or extremely light trowels are supplied at a slight advance, and being too thin for ordinary use are not warranted. In the new goods in brick and plastering trowels there are 10 sizes in the No. 10 Philadelphia pattern in lengths from 8 to 14 in., inclusive. The No. 221 wide heel range from 9½ x 5½ to 11½ x 6 in., and the No. 223 extra wide heel from 10 x 6 to 12 x 6½ in. all in 6 in. hardwood handles. The same pattern and sizes with 6 in. leather handles become Nos. 310, 321 and 323, respectively.

TRADE NOTES.

"IT IS SURPRISING how much there is to know about a nail and how few people know it," is the introductory paragraph in an attractive booklet of a size convenient to carry in the pocket just sent out by the Keystone Nail Company, Pittsburgh, Pa. The first nail in common use was a plain iron nail of square form with four edges from top to point, which was followed later by a steel nail of similar form; then came the steel wire nail very generally used to-day, and finally the "galvanized" nail admirably adapted for outside work, such as siding, sheathing, shingling, roofing, fence building, &c., where a rustproof nail is absolutely essential to good work. The point is made that the Keystone Nail Company was among the first to recognize the need for a nail of this character, and it began operations on a moderate scale, testing, experimenting, proving and perfecting, until it has demonstrated that the only possible practical method of preserving iron and steel from the ravages of rust is by applying a covering or coating of pure zinc. This is accomplished by dipping the nails properly conditioned in a bath of molten zinc maintained at exactly the proper temperature. The company turns out its Keystone brand by the use of patented machinery which gives a uniform product. The claim is made that these nails are stronger and sturdier after galvanizing than they were before; that they are perfectly coated and properly separated, so that there is no waste. Those architects, builders and contractors who may be interested can secure a sample of the nails with catalogue on request.

T. ROBERT WIEGER, formerly associated with the late Frank E. Kidder, 629 Fourteenth street, Denver, Colo., calls attention to the fact that he is prepared to furnish Specification Blanks for all classes of buildings, each trade being separate. A complete set constitutes 44 pages, and those of our readers who are interested can secure a sample page on application.

THE ASBESTOS PROTECTED METAL COMPANY, Canton, Mass., has recently issued a 32-page catalogue relating to the asbestos protected metal turned out by it. The metal is composed of a sheet of steel with a coating of a special asphalt compound, applied at a temperature of 600 degrees F., with a layer of asbestos felt applied on both sides of the sheet and firmly imbedded in the compound, presenting a surface which is water, acid and fire proof. It is made in various forms, flat, corrugated, beaded, &c., and is finished in different colors, or for interior work may be grained to imitate wood. The catalogue carries a number of illustrations showing the practical application of asbestos protected metal in connection with industrial buildings, residences, &c.

THE CONTRACT for placing concrete piles in the foundations of the building to be erected for the Central Bank & Trust Company, Memphis, Tenn., has been awarded to the Raymond Concrete Pile Company, New York City. The Murch Bros. Construction Company of St. Louis are the contractors, and James Gamble Rogers is the architect. The same company also has the contract for placing the concrete piles for the public swimming pool that is being built at the foot of Franklin street, St. Louis, Mo., for the Board of Public Improvements; the general contractors are Fruin-Colnon Contracting Company. Still another contract is for placing concrete piles in the foundations of the power house for the Illinois Traction System at Venice, Ill. The contractors are the Central Illinois Construction Company.

THE OTIS ELEVATOR COMPANY, with branches in the principal cities of the country, has recently taken contracts for the installation of elevators in many of the buildings now in course of erection in New York City. Among these mention may be made of the Pocono, formerly the Parker Building, Fourth avenue and Nineteenth street, three electric passenger and two electric freight elevators; the American Woolen Company's building, Fourth avenue and Eighteenth street, 11 electric passenger, three electric service and two electric sidewalk elevators; the Borgfeldt Building, Irving place and Sixteenth street, four electric passenger, five electric freight and three electric sidewalk elevators; the Bryant Building, Liberty and Nassau streets, three electric traction passenger, two electric passenger and one electric sidewalk elevator; the building at the corner of Fifth avenue and Thirty-first street, three electric passenger, two electric service and two electric sidewalk elevators; the Tilden Building in West Fortieth street, three electric passenger elevators and one electric freight elevator; the Hewitt Building, Twenty-eighth street and Fourth avenue, one electric passenger, two electric passenger and freight, two electric freight and one electric sidewalk elevators.

EXCLUSIVE AGENCIES for handling the NoCoDo steel ceilings, walls and tiling are being established, and elaborate measures are now being taken to increase materially the number of such agencies, by the Northrop, Coburn & Dodge Company, 37 Cherry street, New York City. As a conspicuous assistance to the contracting tradesman contemplating handling the products, the company is conducting an extended national advertising campaign to reach the final buyer through leading monthly and weekly general magazines, and to reach the builders, architects and sheet metal workers through building magazines and trade papers. The stamped steel tiling is, of course, made in sheets, and is for use in bathrooms, kitchens, laundries and other places where porcelain and ceramic tiling is sometimes employed.

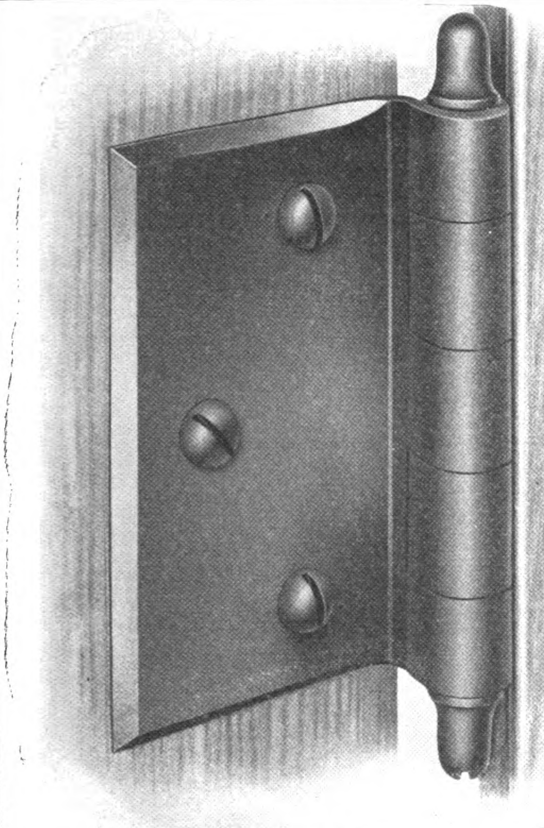
THE RUSSELL JENNINGS MFG. COMPANY, Chester, Conn., in emphasizing the claims of the bit which it manufactures, points out that it bores smooth and clean without choking or splitting. It is made of genuine crucible steel and is of a nature which adapts it for every purpose. Carpenters who are interested in the goods turned out by this concern can obtain full particulars on application.

THE QUESTION of a proper roof covering for a building is always one of profound interest to architects and builders, and they are often much perplexed as to which of the many kinds at present on the market is best adapted for the particular purpose in mind. A product for which strong claims are made and mention of which may not be without interest in this connection, is the seven-ply Underfelt Granite Surface Asphalt Roofing furnished by the McClellan Paper Company, Minneapolis, Minn. The point is made that the roofing is hail and acid proof, does not crack, rot or melt, will not buckle or check, is fireproof from outside contact, and is made from the strongest raw rag stock obtainable and saturated with Gilsonite Land Asphalt mined in this country, and which, according to United States chemist report, "is the best asphalt for saturating purposes now obtainable." The company has issued an interesting little circular relating to this roofing, and will send a sample to any architect or builder making application for it.

KEUFFEL & ESSER COMPANY, 127 Fulton street, New York City, is distributing a four-page folder relating to blue print papers which it is prepared to furnish in any quantity required. The statement is made that as the results obtained in making blue prints depend upon the careful selection and application of the chemicals and essentially upon the quality of the paper employed, it has always been the endeavor of the company to produce papers best adapted for the purpose. The blue print papers are furnished in "regular," "quick" and "electric quick" grades, which are adapted to meet varying requirements. The company states, however, it can furnish paper of other speeds to meet unusual conditions, and it can also supply prepared papers in sheets if ordered in reasonably large quantities. An interesting little book entitled "Photo-Printing from Tracings," which gives full directions, has been issued by the company, and a copy will be mailed free on application.

WHAT IS REFERRED TO as a valuable little work for all users of mechanics' tools is the volume of 288 pages bearing the title "The Tool-Monger," which is being sent out by Montgomery & Co., 102 Fulton street, New York City. The company makes the statement that it will mail a copy of this little work to any one sufficiently interested to make application for it.

THE SIMONDS MFG. COMPANY, Fitchburg, Mass., has added to its already large assortment of goods a new saw known as No. 9 Skew-back Ship Saw, for use as a finishing saw, siding saw, mitering saw, combination hand and panel saw. It has a "crescent ground" Simonds steel blade with four gauges taper for clearance, making, it is claimed, a perfectly graduated blade, and is fully warranted against all defects.



NO. 450

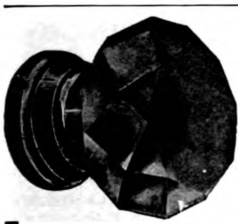
We Initiate—Never Imitate

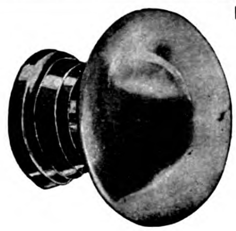
PROFIT PRODUCING POINTERS

¶ They save 50 per cent. in time of hanging doors. An apprentice can hang a door with them. Made of Cold Rolled Steel. Highly polished. Double Plated. Beveled Edges. Slot in false tip for screw driver. Reversible. Round Head Screws. Simple but rich design. Easy to finish around. Will not catch the dust. Any finish desired. One pair in a box with screws.

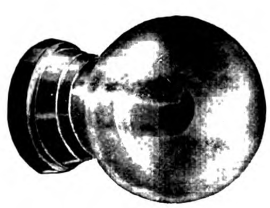
Further detailed information in Catalog "B." It's free. Send us your dealer's name :: :: ::

National Mfg. Company,
Sterling, Illinois





GLASS KNOBS



Our Catalogue

shows 64 distinct styles and sizes, in pressed and cut glass, plain and ornamental designs, for doors, drawers, furniture, etc.

Catalogue No. 2719 upon request.

HAMMACHER, SCHLEMMER & CO.,

HARDWARE TOOLS AND SUPPLIES

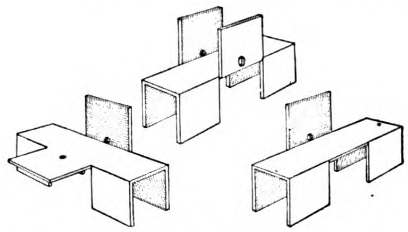
NEW YORK, Since 1848

Fourth Avenue and Thirteenth Street (Block South of Union Square)

NOVELTIES.

Sullivan's Steel Plank Holder for Concrete Work.

Since the introduction of concrete for building purposes one of the features has been the large amount of lumber necessary to make the molds or forms for the concrete walls, and with a view to reducing to a minimum the amount of wood work required, J. H. Sullivan, 411½ South Ionia street, Grand Rapids, Mich., has devised a pressed steel plank holder, by the use of which it is claimed the builder can erect a wall of any reasonable hight with only three planks on each face of the wall. No lateral or perpendicular braces are required to maintain the planks in line or to keep them from bulging, the operation of the plank holders being readily understood from an inspection of the illustrations presented herewith. In Fig. 1 there are shown three plank holders, the upper one of which may be designated as Style "A," the right hand one as "B," and the left hand one as "C." The first two are generally used for straight walls, while the third is well adapted for holding planks together when making a mold or form for a reinforced beam. In Fig. 2 is shown the manner in which the plank holders are used when turning a corner of a concrete wall. When the ends of two planks abut each other and one end is out of line a plank holder is placed on the true end, while the end of the other plank is sprung to a straight line and the plank holder pressed down. The point is made that it will stay in position until the concrete is sufficiently set to allow of the removal of the plank holders. Another use of the holders is shown in Fig. 3, which indicates the manner a straight wall can be built having a cobblestone front with a backing of concrete. The face of this wall could be laid up with cut random stone, or for that matter, stone of any other description, and the backing could be readily filled with concrete without interfering with the cut stone on the front, thus effecting a large saving in comparison with the usual method of executing this kind of work. If, for example, it is desired to show a 1½-in. rock face beyond the wall line proper, place the outside plank 1½ in. beyond the wall line. In setting the cobble or other stones for the face place them so they touch the inside of the outside plank. This will act as a line for the face stone, also for a gauge. Since the plank holders were first introduced a number of improvements have been made in them, one of the most important being the substitution of a No. 12 soft wire instead of ½-in. bolts. In using the latter it was necessary to slightly notch out the lower edge of the planks which naturally marred it for other use, but by substituting wire this objection was overcome, although it is necessary with the wire system to have three planks on each face of the wall instead of two, as originally planned. Mr. Sullivan points out that in executing concrete work the scaffolding should be placed at least 2 in. away from the planks, so that the latter will not be disturbed while the concrete is being put into the mold, and it is suggested as good practice that every three plank high a line should be drawn from corner to corner and line up one side of the curbing. When this is done and a reasonable amount of precaution taken, a wall of concrete can be run by this system as true as with brick or stone. Another valuable feature is that if the work is started level it will not be necessary to level again until it is nearly a story high. In beginning a narrow wall over a wider foundation it is best to use the Style "B" plank holder on the upper edge of the plank for the reason that one lug is eliminated, which permits the ready removal from the concrete of the lower plank. This plank holder "B" can be used on another part of the wall, also for right or left hand corners, as well as for building curbing, beams and the like. The claim is made that the use of these holders effects a saving of from 75 to 80 per cent. of lumber as compared with the old method of erecting concrete walls. A very interesting pamphlet has been issued setting forth the merits of these holders at great length and showing some of their many applications in connection with concrete work.



Novelties.—Sullivan's Steel Plank Holder for Concrete Work.—Fig. 1.—Three Styles of Plank Holder.

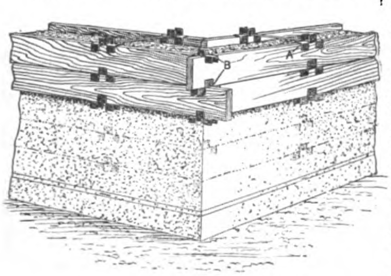


Fig. 2.—Manner of Using the Holders at the Corner of a Concrete Wall.

The Tubular Method of Reinforced Concrete Construction.

The high cost of lumber at the present time, together with the rapidity with which timber supplies of the country are being depleted, has caused no little attention to be directed not only to substitutes for wood in connection with building construction as evidenced by the growing popularity of cement concrete for this purpose, but also to substitutes for the wooden forms or molds which are used in executing concrete work. Among these special interest attaches to what is known as the Tubular Method of Reinforced Concrete Construction which is being introduced to the notice of architects, building contractors and engineers generally by the Concrete Column & Construction Company, with offices in the Stevens Building, 11 to 15 Raynor street, Detroit, Mich. By the "Tubular Method" thin shells or tubes of various shapes made by machine processes of exceedingly dense concrete are shipped to the place where a building is to be erected and used as a substitute for the wooden forms. The claim is made that the tubular parts contain all of the primary reinforcement, so there is little to do at the site of the building but to hoist them into place and pour in fresh concrete. Perfect bonding is claimed to be insured by the rough and porous inner surface of the hollow parts, whose exterior, however, is very dense and impervious. Various forms of finished columns may be done in imitation of granite and other stone effects, the method of manufacture making it easy to brush, hammer-dress or even polish the unusually dense concrete, while the number of effects possible may be increased by varying the aggregates. A very attractive booklet sent out by the company gives in detail much interesting information relative to the use of this tubular system in connection with all the various phases of concrete construction, touching especially upon the question of beams and lintels, trussing, bracing, joints, hollow walls, roofs, floors and surface finish, as well as pointing out the safety and economy of the method under description. The concluding chapter in the booklet deals with concrete lumber and the manner in which it is constructed. Architects and builders who are interested in work of this character can readily obtain a copy of the booklet upon application to the company.

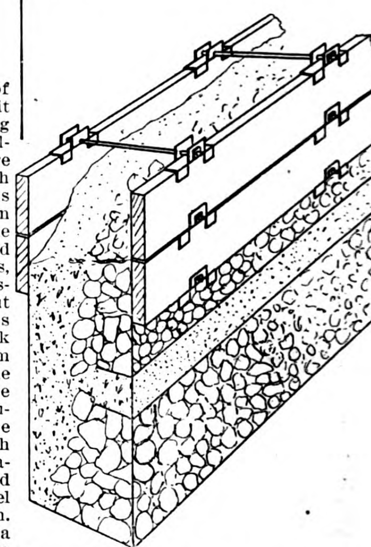
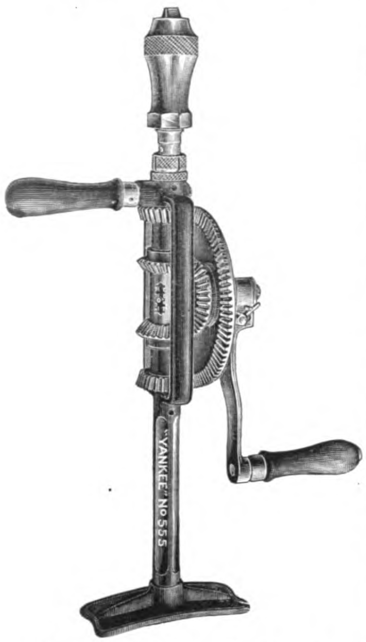


Fig. 3.—Holders in Use on a Straight Wall with Cobblestone Facing.

A New Weather Strip.

The season is practically at hand when the carpenter is likely to be called in to weatherstrip the windows and doors in order to keep out the chilly blasts of winter, and the question often arises as to the style of strip that is best adapted for the purpose. Many kinds are on the market, and strong claims are made for all. One of the novel styles to be brought to the attention of house owners and builders is known as the "Paragon," made by the Noiseless and Draftless Door & Window Cushion Company, 511 West Twenty-first street, Borough of Manhattan, New York. The claim is made for this strip that it is thoroughly effective, rendering windows tight and keeping out all dust, drafts and rain, and it may be applied to



Novelties.—The New "Yankee" Breast Drill.—Fig. 4.—General Appearance of the Tool.

any kind of a window. It is mortised into the middle sash bars and prevents the cold air from getting in, while at the same time it keeps the windows from rattling. One of the strong arguments used in connection with this weatherstrip is that its use results in a saving of fuel by preventing leakage of warm air from the rooms.

The New "Yankee" Breast Drill.

North Bros. Mfg. Company, Philadelphia, Pa., has just added to its assortment of "Yankee" goods a breast drill of single and double speed and with right and left hand ratchet movement. A general view of the single speed drill is shown in Fig. 4 of the illustrations, while in Fig. 5 is an enlarged view of the mechanism. The frame is malleable iron, the spindle of steel turned and fitted, while the gears have the teeth cut from the solid to run smoothly and accurately. The tool is finished in a dead black color, while the bright parts are nickel plated and polished. The peculiar feature of the tool is found in the shifter on the cylinder between the small gears. The mere movement of this shifter in the various notches clearly indicated in the engraving causes the tool to perform different movements. In the first notch nearest the chuck it is an ordinary or plain breast drill; in the second notch it becomes a left hand ratchet useful in removing taps, but especially to loosen the drill if it becomes jammed in a hole and cannot be moved forward or crank revolved backward; in the third notch it becomes a right hand ratchet. When in the fourth notch any movement of the crank, however short, or turned continuously in either direction or a combination of the two, causes the drill in the chuck to always turn to the right and drill continuously; hence no time is lost and double the work is done as compared with a single or right hand ratchet. This peculiar movement is obtained through a more extended combination of the pawls and ratchets used in the other Yankee tools made by the company. The claim is made that it is absolutely positive in action and cannot get out of order. In the fifth or lowest notch the spindle is locked tight, so that the drill chuck can be rapidly opened or closed. The change of speed on the double speed tool is made by pushing a little lever at the hub of the crank toward the gear for fast, and away from the gear for slow speed. This is done in the fractional part of a revolution and at any time, even while drilling, without removing the tool from the work and with any of the various movements of the shifter already explained. The side handle on the Yankee breast drill can be unscrewed, and has on it a screwdriver bit to take care of all the screws on the tool. The breast plate can be adjusted to right angle of the position shown and thus enable the tool to be used close against partitions or in corners. The adjustable ball bearings in the spindle take up all the strain or thrust and relieve all other parts of the tool. The chuck is said to be of new design and will hold accurately and securely with the two jaws either square or round shank drills or other tools up to ½ in. A hexagon at the end of the shell of the chuck permits the use of a monkey wrench for tightening large drills.

New Builders' Derrick.

Many slow and cumbersome methods heretofore employed by builders are from time to time being supplanted by improved equipment which contribute both to speed and economy in construction. An interesting example of progress in this direction is seen in Fig. 6 of the accompanying illustrations, which represents a new circle swing derrick made by Sasgen Brothers, 2744 Lincoln avenue, Chicago, Ill. This machine is operated by hand power, and is designed for handling material on structures from one to six stories high.

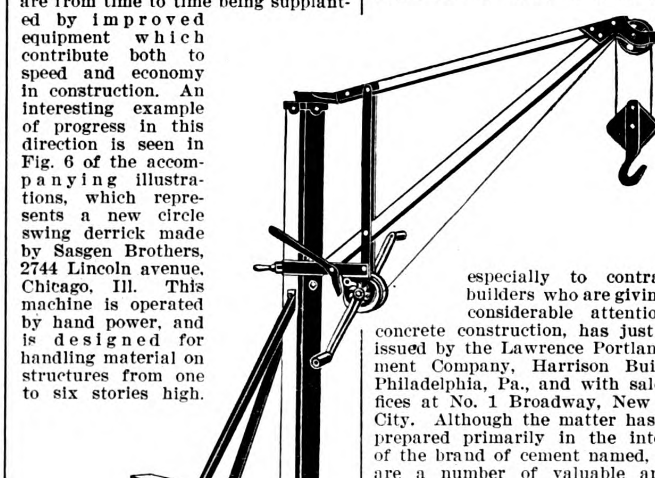


Fig. 6.—New Builders' Derrick Made by Sasgen Brothers, Chicago.

It is built of selected yellow pine, malleable castings and steel braces, and has a hoisting capacity of 1000 lb., which may be increased one-third by the attachment of a rear guy line and substituting triple for double pulley blocks. The derrick is 8 ft. in hight, has a full circle swing of 12 ft. and weighs 250 lb. It is supported on a V-shaped base, composed of two timbers, which is conveniently anchored to the floor joist by three bolts and cleats. The derrick is equipped with a boom lock,

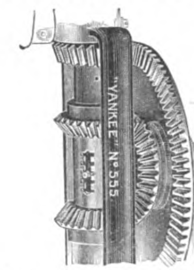


Fig. 5.—Enlarged View of the Mechanism of Yankee Breast Drill.

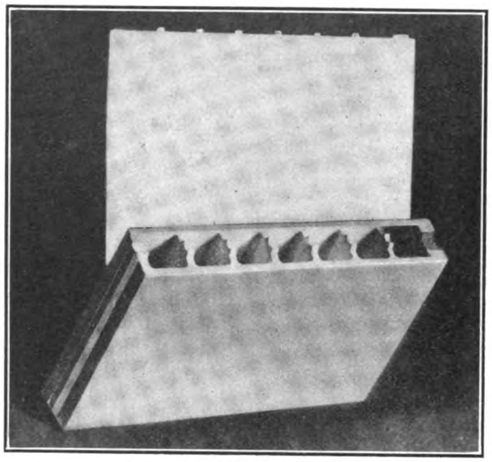
so that the load can be securely locked and held at any part of the circle swing, and when the load is released the block travels downward by its own weight. By the removal of two nuts and one bolt the derrick is separated in two parts, thus making its transfer from place to place an easy matter. It can be easily carried from one part of the building to another by two men, and very little time is consumed in taking down and setting up. Its utility is observed in the handling of window frames and doors which, being swung clear of walls, are hoisted without danger of marring. Evidence of the peculiar adaptation of this machine to light building construction is furnished in the fact that although it has been on the market but a comparatively short time, over 300 are now in use by Chicago builders.

"Dragon" Portland Cement.

A little work of unusual interest and value to users of cement, and especially to contracting builders who are giving any considerable attention to concrete construction, has just been issued by the Lawrence Portland Cement Company, Harrison Building, Philadelphia, Pa., and with sales offices at No. 1 Broadway, New York City. Although the matter has been prepared primarily in the interests of the brand of cement named, there are a number of valuable articles dealing with the general subject of cement, prominent among which may be mentioned Standard Specifications for Cement, with an abstract of foreign specifications; Finishing Concrete Surfaces; Waterproofing of Concrete; Prevention of Rust in Reinforcement for Concrete; Fireproof Qualities of Portland Cement-Concrete; Concrete in Connection with Farm Work and Standard Specifications for Cement Hollow Building Blocks, as adopted by the National Association of Cement Users. Not the least important feature of the work is a short chapter on Miscellaneous Cost Data, numerous tables being presented in connection therewith showing cost of various examples of work executed in different sections of the country. The matter is illustrated with half-tone engravings representing striking examples of concrete construction, and the entire make-up of the matter is such as to render the work a regular cyclopedia of cement practice. It is 5¼ x 7½ in. in size, contains 225 pages and is bound in paper covers.

Dodd's Interlocking Plaster Blocks.

We take pleasure in presenting in Fig. 7 a general view of an Interlocking Plaster Block which is being introduced to the attention of architects and builders by Dodds' Interlocking Block Company, Inc., 24 California street, San Francisco, Cal. These blocks are made in iron molds, perfectly true and square, in order to insure a first-class uniform cast. They are kiln dried, making a hard, dry finish, and it is pointed out by the company are lighter in weight than other forms of partition as constructed at the present day. It is claimed to be unnecessary to use reinforcing rods in a partition constructed of these blocks, as the latter give a strong and perfectly straight, sanitary, sound and fireproof partition which does not crack, is capable of standing hard usage and requires neither wood grounds nor blocks to which to nail the trim of a room. The partition blocks are interlocking, requiring no plugs for base and picture molding and only a skim or finishing coat of plaster to complete the work. It is pointed out that the partitions are especially suitable for the subdivision of offices, as they can be erected and finished the same day. They are also recommended for use in hospital and school construction and for other places where soundproof qualities and sanitary finish are requisite. The company carries in stock at its factory a large supply of standard size blocks measuring 2½ and 4 in. in thickness. The illustration shows one of the blocks tilted at a slight angle, clearly exposing the interlocking feature, also a block resting in a vertical position. In addition to the manufacture of interlocking plaster partition blocks the company also makes a specialty of ornamental plastic decorations, fibrous ceiling slabs, imitation Caen stone and artificial granite blocks. The company's interlocking concrete blocks are referred to as especially desirable for outside walls, and can be supplied with finished face, chamfered, rustic and rock or granite face.



Novelties.—Fig. 7.—Dodd's Interlocking Plaster Blocks.

A New Bench Hand Planer.

A machine which is designed to do a great variety of small work and to do it more rapidly and conveniently than a large machine is the No. 254 bench hand planer, which has just been placed upon the market by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio. The point is made that the construction of the machine is as complete in every adjustment as the large type of machine. The tables are 6 in. wide by 20 in. long, are adjustable on long gibbed inclines free from vibration, and the fence is arranged to angle to 45 degrees. The cutter head bearings are of improved self-oiling type, and the company's safety circular cutter head is used on the machine. When so ordered the company furnishes at a slight extra charge with each machine a bench box on which to place it, the box having a hole in the top to receive the shavings and is supplied with doors for removing them. In Fig. 8 of the illustrations is presented a general view of the machine mounted upon a bench box clearly showing the swing doors referred to.

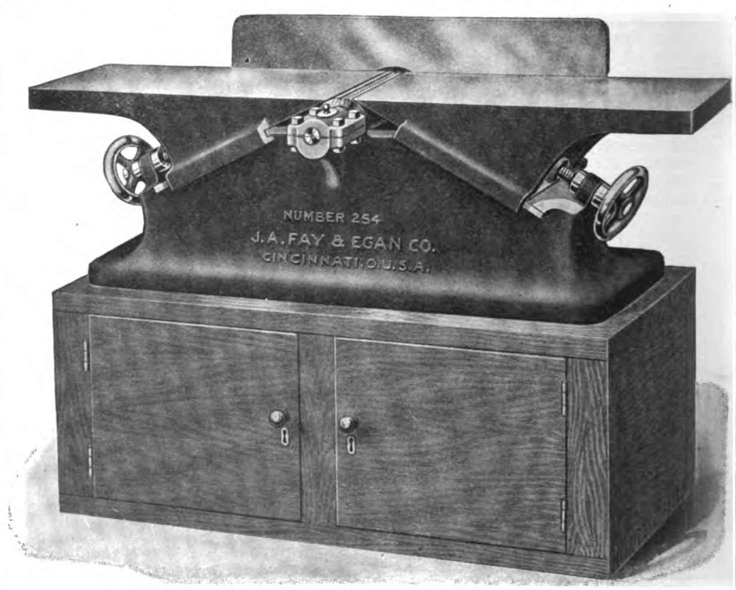


Fig. 8.—A New Bench Hand Planer.

Climax System of Reinforced Concrete Hollow Beams.

The Climax Company, 131 La Salle street, Chicago, Ill., is sending out an interesting pamphlet of a size convenient to carry in the pocket and setting forth the merits of the Climax Patent Hollow Reinforced Concrete Beams. The latter are cast in molds with a removable core, using a "slush mix" made in a "batch" mixer, which is now generally recognized as the most reliable method of making concrete It is pointed out that the section of concrete is so small in all parts of these beams that they become thoroughly dry in a very short time. The patent hollow beams have a reinforcement of wire fabric extending entirely around the periphery, with additional members of round steel bars in the lower core as tension stresses may render necessary. In the pamphlet in question tables are given for computing floors constructed of the company's beams of reinforced concrete, also those giving safe live loads per square foot which floors will support if uniformly distributed on the different spans.

The "Hercules" Plaster Board.

A fire resisting substitute for lath and plaster and which can also be used in the place of lumber as a sheathing under weatherboards, is being introduced to the attention of architects and building contractors by the Plaster Products Company, Hampton, Va. It is known as the "Hercules" Plaster Board, and may be used for a variety of purposes. For high class work the company states that the most satisfactory result is obtained by first applying ¼ to ⅜ in. brown coat of any good brand of hard wall or wood fibered plaster over the Hercules plaster board, and after this is thoroughly set top off with a thin coat of finishing plaster. For summer cottages, bungalows or temporary constructions the "Hercules" can be used without plaster by simply pasting wall paper directly over the board. When used in this way it is suggested that the seams or joints be pointed up with plaster in order to make a smooth surface. For repair work the plaster board can be nailed directly on the old lath and fin-

Novelties.—Fig. 9.—Black Bros. Clamp for Built-Up Columns.

ished with a thin white coat after the cracked and broken plaster has been removed. For fireproofing purposes the plaster board is nailed solid to wooden or exposed surfaces. The claim is made that the use of this plaster board results in a great saving of time, labor and plaster, and that it renders houses cooler in summer and warmer in winter, as it is claimed to be impervious to heat or cold. At the same time it is said to be a nonconductor of sound, will not shrink or buckle, is light in weight and flexible. The boards are 32 x 36 in. in size and are therefore specially adapted for nailing directly to studding placed 16 in. on centers. The company suggests that 1¼ in. wire nails with large heads be used, spacing the nails 4 to 6 in. apart.

Black Brothers' Clamp for Built-Up Columns.

Among the candidates for popular favor in the way of a clamp for use in connection with the manufacture of built-up staved columns is the device illustrated in Fig. 9 of the engravings and made by Black Brothers Machinery Company, Mendota, Ill. The clamp is made in two sizes, the smaller with ¼-in. tested chain 4 ft. long and with ¾-in. cold rolled

Fig. 10.—Weber's Sandpaperer and Scraper.

screw, cast nut and steel handle. The larger size has 5-16-in. tested chain, 1-in. cold rolled screw with cast iron nut and steel handle. The hook fastened to the cast iron jaw of the clamp is a steel forging. The handles are so constructed that if the clamps are put on close together the handle turns from one side to the other, so that it does not come in contact with the clamp next to it. The device is exceedingly easy of application to the work, and is strong and durable. The clamps are being extensively used by factories making staved columns for house work, also for built-up pillars for dining room and other tables. The illustration clearly shows the general construction of the device, also its application to a built-up column.

Weber's Sandpaperer and Scraper.

What is referred to as something of a distinct departure in its way is the sandpapering device and scraper which we illustrate in Fig. 10 of the engravings, and which is being introduced to the trade by the Weber Mfg. Company, 672 Seventy-first avenue, West Allis, Wis. The construction of the device is such that the operator can retain a firm hold upon it while working in corners, or under adverse conditions, and the claim is made that it is efficient, durable and economical. By reversing the sandpaperer from the position shown in the illustration it becomes a scraper, the knife in which is fastened with a clamp, there being no holes or slots in it, and any length of knife, it is claimed, may be used until only ½ in. of it remains. It works easily and quickly and is referred to as a handy tool for the carpenter's kit.

The Polygon Concrete Mixer.

We have received from the Waterloo Cement Machinery Corporation, successors to the Waterloo Cement

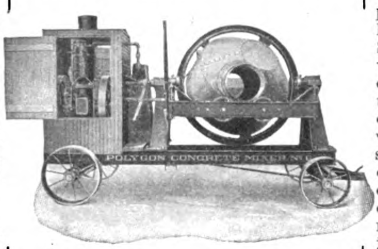
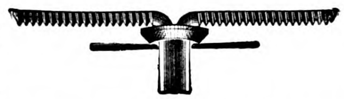


Fig. 11.—The Polygon Concrete Mixer.

Machinery Company, Waterloo, Iowa, a copy of a very attractive catalogue just issued from the press illustrating and describing the Polygon concrete mixer. In the presentation of the matter, it is pointed out that the various types of concrete mixers resolve themselves into three general classes: First, the continuous mixer; second, the "batch" mixer, with stationary receptacle and movable deflectors, and third, the "batch" mixer, with movable receptacle, the latter being either itself of such a shape as to tend to mix the materials, or having blades or deflectors calculated to perform the mixing function. These types are described somewhat at length and lead up to the statement that the tilting type of machine is the one best adapted to the rapid and economical mixing and handling of concrete. The Polygon is of this type, and is so constructed that it may be quickly charged and discharged, the discharge lever being always under perfect control and enabling the operator to discharge as much or as little as he pleases. The distinguishing feature, however, of the Polygon, a view of which is shown in Fig. 11, is its superior mixing quality due to the design of the drum. This is pointed out as being a very decided departure from the commonplace circular or plain conical drum, and while it will produce by reason of its shape and the manner in which it is hung, a perfect mixture without the aid of other devices, the company makes use of a series of from four to six blades on the Polygon to accelerate the action set up by the contour of the drum. The Polygon mixer is furnished with or without power, as may be desired. In all cases where power equipment is furnished for the mixer the direct bevel gear drive is used, the power being transmitted from the main driving shaft to the drum gear by a bevel pinion. This is claimed to be the simplest and most satisfactory form of transmission, as there are no super-



Siamese Twin Bolts.—Fig. 12.—The Bolt Open for Insertion.

fluous parts to break or wear out and the power lost is reduced to a minimum. In addition to the extended description of the Polygon mixer, the catalogue gives attention to engines of various kinds, repair parts, hoisting engines, dump carts, concrete spreaders, wheelbarrows, sand screens, &c. Not the least interesting feature of the catalogue is a table showing the quantities of materials required for 1 cu. yd. of rammed concrete based upon a barrel of 3.8 cu. ft.

Siamese Twin Bolts.

The Diamond Expansion Bolt Company, 90 West street, New York City, has added to its extensive line the Siamese Twin Bolt illustrated herewith. It is designed for making secure fastenings to hollow metal, and the claim is put forth that it will bolt on to hollow metal sash, door trim, window frames, skylights, sheet metal store fronts, metal ceilings and wainscoting, and in fact anything hollow of sheet metal where a common bolt cannot be used because the head cannot be secured or where there is nothing to hold a wood screw. It serves also to fasten window shade and awning brackets, ornaments, electrical devices, ventilators, insulators, awning hoods, &c. The point is made that it cannot slip out of place or loose its grip by turning, at the same time it distributes the load over a greater surface of metal than other forms of construction. In Fig. 12 of the illustrations the bolt is shown open for in-

Fig. 13.—The Bolt Closed and the Nut Attached.

sertion, while in Fig. 13 it is represented closed and the nut attached.

TRADE NOTES.

THOSE of our readers who may be desirous of perfecting themselves in practical drafting, designing and detailing are likely to be interested in an announcement presented in another part of this issue by the chief draftsman of the Engineers' Equipment Company, Chicago, Ill. The point is made that as chief draftsman he knows exactly the quality and quantity of practical training, knowledge and experience it is necessary for one to possess in order to secure a good position and make rapid advancement. The instruction will be given personally to a limited number of selected ambitious men who are interested along the lines indicated.

THE SHEFFIELD GAS POWER COMPANY, Sheffield Station, Kansas City, Mo., has purchased the factory and good will of the former Weber Gas Engine Company and is in a position to furnish the entire line of Weber gas engines and gas products. The management of the business is in new hands, George M. Hawes being president, Freeman Field, vice-president and treasurer, and W. H. Spiller, assistant manager.

THE TURNER CONSTRUCTION COMPANY, 11 Broadway, New York City, has secured the contract for the new reinforced concrete manufacturing plant to be erected at Buffalo by the Pierce-Arrow Motor Car Company of that city. The architects and engineers are Lockwood, Green & Co., Boston, Mass. There will be five separate buildings of various sizes and hights, all strictly fireproof.

MORIN & PICARD is the name of a firm of contractors and builders recently organized in Worcester, Mass. They have purchased a tract of land in Quinsigamond, upon which they will erect buildings.

THE BOSTROM-BRADY MFG. COMPANY, Atlanta, Ga., has established a permanent branch house at 1153 Pine street, St. Louis, Mo., under the management of D. C. Harrison, where a standing stock of their various levels will be kept for quick shipment throughout the West. The company reports an increase of 300 per cent. in their business during the last 18 months. It is intended to open branch houses in New York and other cities during next spring.

I. P. FRINK, 551 Pearl street, New York City, has just been awarded the grand prize for reflectors by the management of the Alaska-Yukon-Pacific Exposition.

AN ATTRACTIVE BOOK of facsimile testimonial letters relating to the Acme floor scraping outfit has been issued by the maker, Joseph Miotke, Milwaukee, Wis. There is something impressive in the individuality of hand written letters which commands attention, and since all of the letters here reproduced represent actual correspondence between the buyer and manufacturer, a glimpse is afforded of the opinions respecting the merits of the device. Correspondence from a military department of the Government which resulted in an order for a scraper is included in the reproductions. The Acme floor scraping outfit, including blade sharpener and sander, is sent on a week's free trial, to be returned at the maker's expense if, as the proposition reads, "it has not proven itself to be the best floor scraping equipment on the market." A half-tone view of the outfit is shown on the last page, the items included being the floor scraper, blade sharpener, sander, one dozen blades, file, gauge, oil stone, two wrenches, two bolts, burnisher and box of tallow.

THE AUTUMN NUMBER of the "Advocate" contains the usual amount of interesting matter touching the merits of Cortright Metal Shingles and Roofing, and is illustrated with several half-tone engravings of dwellings which have been covered with the company's product. There are also a number of testimonial letters showing the satisfaction which the metal shingles turned out by the Cortright Metal Roofing Company, 50 North Twenty-third street, Philadelphia, Pa., have given wherever used.

THE MONTROSS METAL SHINGLE COMPANY, Camden, N. J., is meeting with a most gratifying demand for its metal shingles and the factory is working day and night to fill orders. Among recent bookings was an order for a thousand squares for a prominent contractor and builder in Oregon to be used on some public buildings in course of erection in that State; three carloads for a Philadelphia firm and numerous orders from points all over the country from builders who are erecting houses, barns and other structures. The point is made that the Montross Metal Shingles are light, durable and inexpensive, and are fire and storm proof. They are easily laid with hammer and nails and have a special locking device which it is claimed prevents them from rattling. Any architect or builder who may be interested in securing detailed information regarding these shingles can secure a copy of the company's catalogue by writing to the above address.

THE A. W. BURRITT COMPANY, "the Mantel Folks," 349 to 473 Knowlton street, Bridgeport, Conn., is directing the notice of contracting builders to an announcement which cannot fail to command their close consideration. The offer is designated as the "Burritt Combination No. 72," consisting of a solid oak mantel 6½ ft. high, with 16 x 28 in. beveled plate mirror, glazed tiles for the facing and hearth and a combination wood and coal grate, delivered freight paid at the station of the builder or house owner at a figure which brings it within the reach of all. The price which the company names applies to any point east of the Mississippi River, and the suggestion is made that those who may be interested write for a copy of Catalogue "C," which gives much information concerning the various lines of mantels turned out.

THE BRIDGEPORT WOOD FINISHING COMPANY, New Milford, Conn., manufacturer of Wheeler's wood filler, Silex and Bridgeport standard paint and wood finishing products, issues a number of attractive booklets covering modern artistic effects in wood finishing, modern floor finishing and prepared paint; also a catalogue and price-list of paint and wood finishing products. In connection with its comprehensive plan for co-operating with the retail merchant in the sale of its products the company is sending out attractive signs for display purposes.

Carpentry and Building

PUBLISHED MONTHLY

To all parts United States and Mexico, ... $1.00 Per Year
To all other Countries, ... 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHER ....14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, ...Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—C. F. ENGLISH, ...Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, ...Park Building, 357 Fifth Avenue.
CHICAGO—H. M. KLINGENFELD, C. J. KNAPP, ...Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, ...Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, ...The Cuyahoga, 216 Superior Avenue, N. E.

ENTERED AT THE POST OFFICE NEW YORK AS SECOND-CLASS MATTER.

t. p. and i.

Carpentry and Building

Published Monthly by David Williams Co., 14-16 Park Place, New York.

VOL. XXXI. No. 1. NEW YORK, JANUARY, 1909. Ten Cents a Copy One Dollar a Year

VEA

HAVE YOU SEEN ALL our "YANKEE" TOOLS?

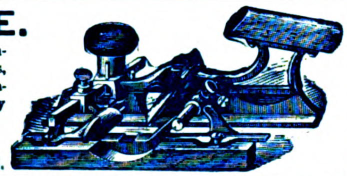
Get our new Tool Book full of up-to-date Labor-saving Tools, that interest all classes of mechanics. It is the embodiment of "Yankee" ingenuity, illustrated with photographic reproductions of the tools in use. *Send today — it's worth having.*

A postal brings it if you say "Carpentry and Building."

Your Dealer Sells "YANKEE" TOOLS.

NORTH BROS. MFG. CO., Philadelphia, Pa., U. S. A.

FALE'S PAT. PLANE.



Constituting Carpenter Plow, Dado, Filletster, Matching Sash, Hollows, Rounds, Beads, Rabbets, Nosings, Case Mouldings, Quarter Rounds, &c. The most Compact and Serviceable Tool ever invented. Universally endorsed by carpenters.

AGENTS WANTED.

OTIS A. SMITH, Sole Mfr., Rockfall, Conn.

The expense and annoyance of painting will not recur every year or two if you use

Dixon's Silica-Graphite Paint

the "Proven Shield for Steel Work." Durability records in all climates; write for a few.

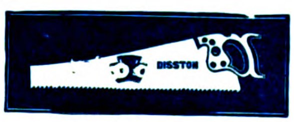
Joseph Dixon Crucible Co., Jersey City, N. J.

DISSTON SAWS

RUN EASIEST
CUT FASTEST
LAST LONGEST

To the practical SAW USER this tells the full story of HIGHEST PERFECTION in Material, Temper, Design and Workmanship attained for the

DISSTON BRAND of SAWS.



These are not mere claims, but established facts.

HENRY DISSTON & SONS, Inc.,

Keystone Saw, Tool, Steel & File Works.

Philadelphia, Pa.

Use Our

Folding and Adjustable Handle Draw Knife!

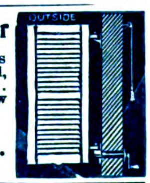
It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts,

A. J. WILKINSON & CO.

180-188 Washington St., Boston, Mass., U.S.A.

Mallory Shutter Worker



Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by

MALLORY MFG. CO.

FLEMINGTON, N. J.

GRINDSTONES

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.

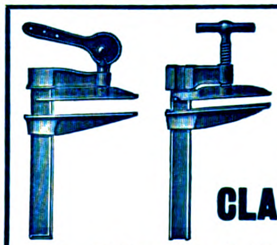
6th Floor, Hickox Bldg., CLEVELAND, O.

PREVENTS DRAFTS, DUST AND WINDOW RATTLING.

IVES' PATENT
Window Stop Adjuster.

PATENTED.

The only Stop Adjuster made from one piece of metal with solid ribs and heavy bed that will not cup, turn or bend in tightening the screw. Manufactured only by The H. B. IVES CO., New Haven, Conn., U. S. A. (Fifty-page Catalogue Mailed Free.)



COLT'S CLAMPS

Ask for catalogue No. 129

BATAVIA CLAMP CO.,

23 Center Street, BATAVIA, N. Y.

THE WILLIAMS PRINTING COMPANY, NEW YORK

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects and Builders Magazine" sent on request.

Published monthly at $2.00 a year. Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren St., N. Y.

FRINK'S TUNGSTEN CLUSTERS

are the most efficient interior lighting-fixtures ever designed. Catalogue and full information on request.

I. P. FRINK, 551 Pearl St., New York

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAWS, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW.

C. E. JENNINGS & CO., 42 Murray Street, NEW YORK. SOLE MANUFACTURERS

Plasterers' STOVES

2 Sizes

Send for Price.

THE S. M. HOWES CO. 40-46 Union Street, Boston

STANDARD FOR OVER 35 YEARS.

Our name stamped on every foot is a guarantee that you are getting the best sash cord that can be made.

You've tried the rest Now buy the best The best is the cheapest

Buy Tools and Supplies In New York

at Wholesale Prices

Write today for a FREE Copy of this great Catalog No. 94—over 700 pages full of illustrations of all kinds of tools, hardware and other useful things for the home, shop and farm Over 75,000 articles are described so clearly you can select as satisfactorily as if you were right here on the ground.

No store in the largest city shows the great variety of goods covered by this Catalog. No store anywhere makes such low prices. We sell in small or large lots at wholesale prices. We can't begin to tell you here how complete the Catalog is. You must see it yourself. This book costs us one dollar each to print, but we send it FREE to any one who writes for it in good faith.

This Catalog shows you how to save money on everything. Write for it today and do all your buying in New York.

Tools a Specialty. Our tools are the best grade, the kind the best mechanics are proud to own and use.

We have been selling tools and hardware for almost a century.

We sell reliable goods only. We guarantee everything we sell to give satisfaction or money refunded. We ship promptly and guarantee safe delivery of our shipments, and refer to the publishers of this paper as to our responsibility.

WHITE, VAN GLAHN & CO., 14 Barclay St., New York City

The Oldest Mail Order House in America. Established 1816.

TAINTOR Positive Saw Set

Sold by the Trade

You can get a cheaper Saw Set than the Taintor Positive because they make them cheaper. You cannot get a better one because better ones are not made.

TRY IT If you like it tell others If you don't like it tell US.

Send for our free circular

"Hints on the Care of Saws"

TAINTOR MFG. COMPANY, 113 Chambers Street, - NEW YORK

The HOLDALL BRACE

IT'S NEW and has jaws which adjust themselves to the shape of the shank. They grasp and hold securely straight, taper, round and square shanks. The sleeve is correct in shape for comfort to the hand and to obtain the firmest grip. Every part of the Brace is made with greatest care. We say without hesitation that the Holdall is the most perfect tool of its kind yet offered. Made in usual sizes with 8, 10, 12 and 14 inch sweep.

Ask for catalogue giving further description.

Millers Falls Company, 28 Warren Street, - New York

MONARCH Sash Chain IS THE BEST

Samples free. Mention this paper.

The Bridgeport Chain Co. Bridgeport, Conn.

BURLINGTON VENETIAN BLIND CO. MAKERS OF BLINDS AND SCREENS BURLINGTON, VT.

Ford's Double Quick AUGER BIT

Bores twice as fast as the average Bit, but quite smoothly and easily enough for Oak or Ash. A great time saver. For putting in door locks, etc., it is unequalled.

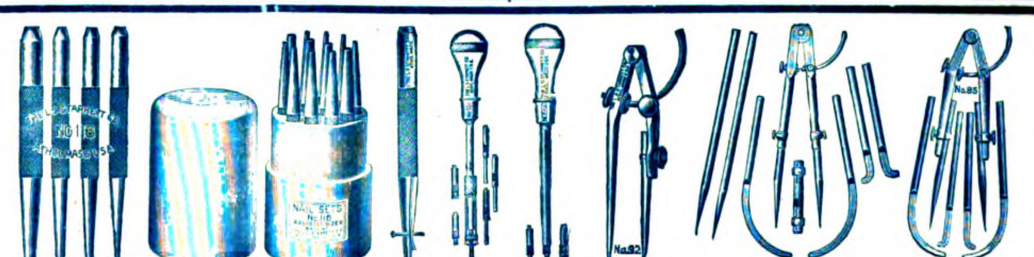
FORD AUGER BIT COMPANY, 103 Cabot Street, Holyoke, Mass., U. S. A

If your dealer hasn't got

SAMSON SPOT SASH CORD

he can easily get it for you. There is no "just as good."

Samson Cordage Works Boston, Mass.



SOME STARRETT TOOLS FOR WOOD WORKERS.

Send for free Catalogue No. 17 P, Illustrated, 176 Pages.

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

Carpentry and Building

Published Monthly by David Williams Co., 14-16 Park Place, New-York.

VOL. XXXI. No. 2. NEW YORK, FEBRUARY, 1909. Ten Cents a Copy One Dollar a Year

Carpentry and Building

Published Monthly by David Williams Co., 14-16 Park Place, New York.

VOL. XXXI. No. 3. NEW YORK, MARCH, 1909. Ten Cents a Copy One Dollar a Year

Carpentry and Building

Published Monthly by David Williams Co., 14-16 Park Place, New York.

VOL. XXXI. No. 4. NEW YORK, APRIL, 1909. Ten Cents a Copy One Dollar a Year

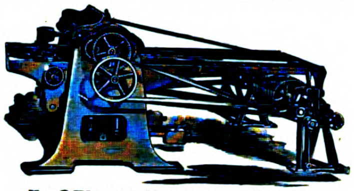
CORDESMAN, MEYER & CO.

26, 28 and 30 Central Avenue

CINCINNATI, OHIO.

Manufacturers of Latest Improved

Wood-Working Machinery



No. 2 Planer, Matcher and Moulder.

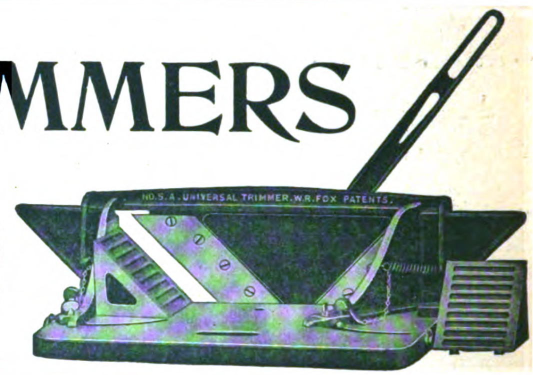
Universal Wood-Worker.

FOX TRIMMERS

FOR INTERIOR FINISH

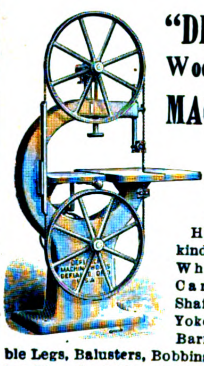
It's expensive business to have a high priced interior finisher whittling out his work with a block plane, trying it with a square or bevel protracter, and whittling some more, when **one stroke** with a Fox Trimmer is all that is required. Get a Trimmer and **cut it out.**

Fox Machine Co., 387 Front Street, Grand Rapids, Mich.



28" BAND SAW

"DEFIANCE" Wood-Working MACHINERY



For making Handles of every kind, Hubs, Spokes, Wheels, Wagons, Carriages, Rims, Shafts, Poles, Neck-Yokes, Single-Trees, Barrel Hoops, Table Legs, Balusters, Bobbins, Spools, Insulator Pins, Oval Wood Dishes and for General Wood Work.

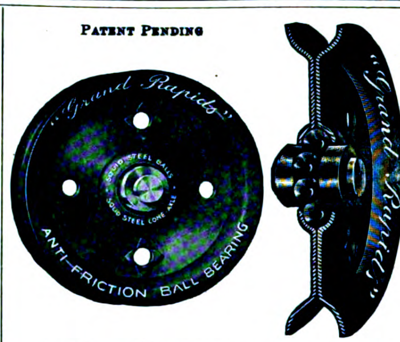
Invented and Built by

The Defiance Machine Works

Defiance, Ohio

London Office, 71 Queen St., E. C

PATENT PENDING



"Ball Bearing" Grand Rapids All-Steel, Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,

3 PEARL STREET GRAND RAPIDS, MICH.

Plank Frame Barn Construction

By JOHN L. SHAWVER

Presents a complete system of framing which combines economy with advantageous features of construction.

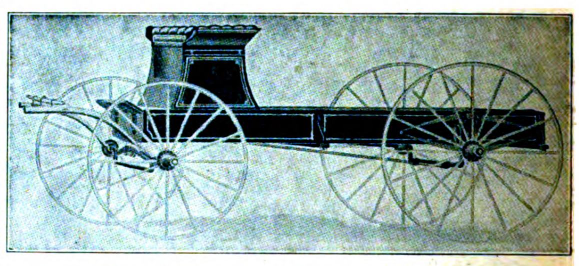
ILLUSTRATED.
CLOTH BOUND.

Fifty Cents, Postpaid.

DAVID WILLIAMS COMPANY

14-16 Park Place, NEW YORK

CARPENTER'S DELIVERY WAGON



For carrying lumber, building material, tools, etc. Made long, wide and strong—will hold a lot of lumber. Body right height from ground—wheels right size. Turns short—runs smoothly. Easy to load and unload. Nicely finished. A wagon any builder will feel proud of. **We guarantee it in every particular.** Complete catalog on request. Mention this paper and our address in full.

SYCAMORE WAGON WORKS, 150 Edwards Street, Sycamore, Illinois

THE "GLOBE" VENTILATOR

In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy N.Y.

THE "GLOBE" IS BUILT ON HONOR AND SOLD ON MERIT

Carpentry and Building

PUBLISHED MONTHLY BY DAVID WILLIAMS CO., 14-16 PARK PLACE, NEW YORK

VOL. XXXI. No. 5. NEW YORK, MAY, 1909. Ten Cents a Copy One Dollar a Year

BLACK DIAMOND FILE WORKS.

Est. 1863. Inc. 1895.

TRADE MARK.

Twelve Medals

OF AWARD AT

International Expositions,

SPECIAL PRIZE,

GOLD MEDAL,

AT ATLANTA, 1895.

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. BARNETT COMPANY,

PHILADELPHIA, PA.

The Scientific Deadener

SEND FOR SAMPLE AND CIRCULARS

SAMUEL CABOT
Sole Manufacturer
141 Milk Street
Boston, Mass.

The Warmest Sheathing

Cabot's Shingle Stains

Brick Preservative

Conservo Wood Preservative

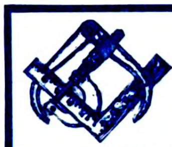
IF YOU HAVE NEVER USED . . . . .

STANLEY'S BALL BEARING STEEL BUTTS

You have missed the best thing made for the hanging of doors. They are noiseless, never have to be oiled and are **Everlasting.**

SEND FOR ILLUSTRATED BOOKLET.

THE STANLEY WORKS, Dept. E., New Britain, Conn. 79 Chambers St., N. Y.



STARRETT TOOLS

Squares, Protractors, Nail Sets, Levels, Scrapers, Dividers, Rules

More on last cover page. But send for Catalog No. 18P. Free.

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

Carpetings of the Past

and hardwood coverings of the present and future are in mighty contrast, cool and pleasant to the eyes during the long hot days of summer. The cost of the additional comfort is slight. Write for colored floor plates and prices.

THE INTERIOR HARDWOOD CO.
MANUFACTURERS INDIANAPOLIS, IND.

SAMSON SPOT SASH CORD

Proved by both tests and long experience to be much cheaper in both first and final cost than metal chain or similar devices. Far more durable and economical than common cord.

Let us send you tests and samples, also table showing the proper sizes for use with different weights and pulleys.

SAMSON CORDAGE WORKS
Boston, Mass.

STOP Paying High Insurance Rates.

FIRE INSURANCE IS A PERPETUAL COST

OUR NEW CENTURY METAL SHINGLES

WILL SAVE YOU MONEY

They are fireproof, light, unbreakable, artistic, handsomely embossed, lock perfectly and are patented. And then figure on this—that they are cheaper than wood, cheaper than anything when you figure all the savings involved, cost of insurance, etc.

Don't fail to get booklet, No. 25, we send you free, chock-full of the roofing question, comparative cost, estimates, designs, etc.

Ornamental Metal Ceiling, Louis XIV design.
Send for finely illustrated Ceiling Catalogue.

Chattanooga Roofing & Foundry Co., Chattanooga, Tenn.

New York Office, 440 Greenwich Street.

PROTECTION BRAND

ASPHALT GRAVEL ROOFING

Is the Best Roofing Made To-Day.

Because it is made from the Best Raw Materials and can be laid so that all nails are covered. There is no chance of Leaks being caused by Water running through Nail Holes. SEND FOR SAMPLES AND PRICES.

ASPHALT READY ROOFING CO.,
136 Water St., New York.

Carpentry and Building

PUBLISHED MONTHLY BY DAVID WILLIAMS CO., 14-16 PARK PLACE, NEW YORK

VOL. XXXI. No. 6. | NEW YORK, JUNE, 1909. | Ten Cents a Copy One Dollar a Year

Carpentry and Building

PUBLISHED MONTHLY BY DAVID WILLIAMS CO., 14-16 PARK PLACE, NEW YORK

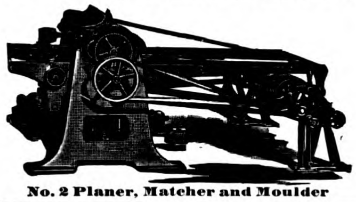
VOL. XXXI. No. 7. NEW YORK, JULY, 1909. Ten Cents a Copy One Dollar a Year

CORDESMAN, MEYER & CO. 26, 28 and 30 Central Avenue

CINCINNATI, OHIO

Manufacturers of Latest Improved

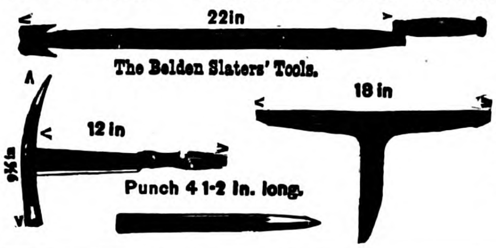
Wood-Working Machinery



No. 2 Planer, Matcher and Moulder

Universal Wood-Worker

SLATERS' TOOLS—THE RIGHT KIND AT THE RIGHT PRICE



¶ **BELDEN'S SLATERS' TOOLS** have been made and given satisfaction for over 20 years.

¶ They are Drop-Forged of Special Tool Steel and every tool is guaranteed.

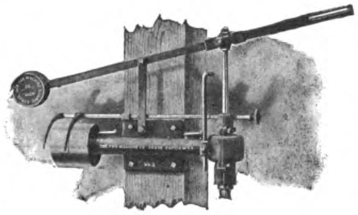
¶ They have Leather Handles that are practically indestructible. The Hammers are perfectly balanced.

¶ Sold separately or in sets. If your dealer does not carry them write us for Circular No. 7 and prices.

THE BELDEN MACHINE CO.
18 TRYON ST., NEW HAVEN, CONN.

FOX Post Boring Machines

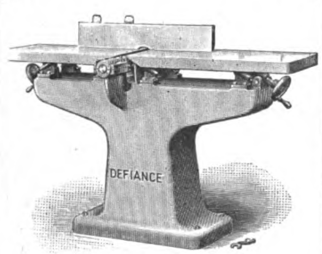
while **very reasonable in price** do absolutely high grade work, because strictly high grade in construction. A strong feature of the Fox is the bevel gear, driving mechanism. No working part is exposed except the spindle itself. Both the bevel gears and the driving shaft are covered completely. The throw of the spindles is 10½ inches, much greater than most similar machines. Belt shifter can be easily arranged to work from either side. Many other good features. Get the Catalog.



Fox Machine Co., 387 Front Street, Grand Rapids, Mich.

TWELVE-INCH

HAND PLANERS



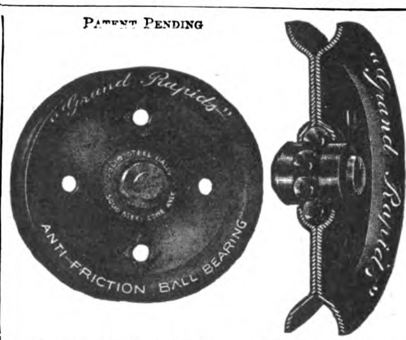
"DEFIANCE" WOOD-WORKING MACHINERY

For Making Handles of every kind, Hubs, Spokes, Wheels, Wagons, Carriages, Rims, Shafts, Poles, Neck-Yokes, Single-Trees, Barr I Hoops, Bobbins, Spools, Insulator Pins, Table Legs, Balusters, Oval Wood Dishes and for General Wood Work.

Invented and Built by

The Defiance Machine Works
Defiance, Ohio
London Office, 71 Queen St., E. C.

Patent Pending



"Ball Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

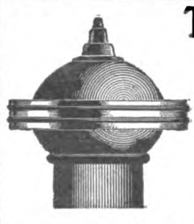
At prices under the common, ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash pulley makers in the world. We ship direct or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
3 PEARL STREET GRAND RAPIDS, MICH.



THE "GLOBE" VENTILATOR

In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

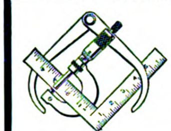
Manufactured by **GLOBE VENTILATOR CO.** Troy, N. Y.

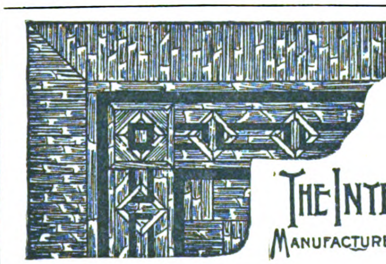
THE "GLOBE" IS BUILT ON HONOR AND SOLD ON MERIT

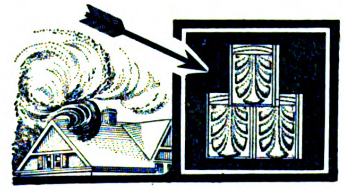
Carpentry and Building

PUBLISHED MONTHLY BY DAVID WILLIAMS CO., 14-16 PARK PLACE, NEW YORK

VOL. XXXI. No. 9. NEW YORK, SEPTEMBER, 1909. Ten Cents a Copy One Dollar a Year







Carpentry and Building

PUBLISHED MONTHLY BY DAVID WILLIAMS CO., 14-16 PARK PLACE, NEW YORK

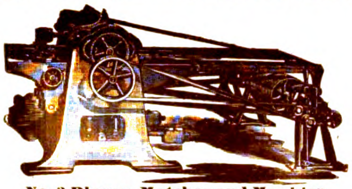
VOL. XXXI. No. 12. NEW YORK, DECEMBER, 1909. Ten Cents a Copy
One Dollar a Year

CORDESMAN, MEYER & CO. 26, 28 and 30 Central Avenue,

CINCINNATI, OHIO

Manufacturers of Latest Improved

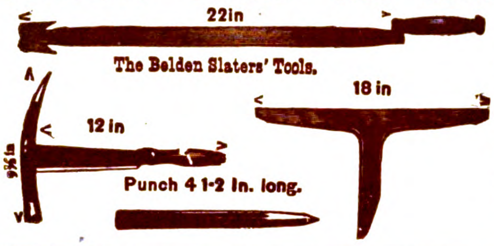
Wood-Working Machinery



No. 2 Planer, Matcher and Moulder

Universal Wood-Worker

SLATERS' TOOLS—THE RIGHT KIND AT THE RIGHT PRICE

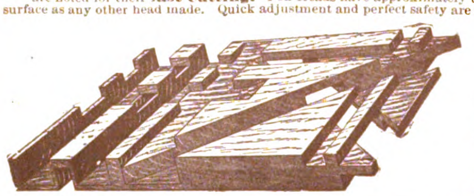


¶ **BELDEN'S SLATERS' TOOLS** have been made and given satisfaction for over 20 years.
¶ They are Drop-Forged of Special Tool Steel and every tool is guaranteed.
¶ They have Leather Handles that are practically indestructible. The Hammers are perfectly balanced
¶ Sold separately or in sets. If your dealer does not carry them write us for Circular No. 7 and prices.

THE BELDEN MACHINE CO.
18 TRYON ST., NEW HAVEN, CONN.

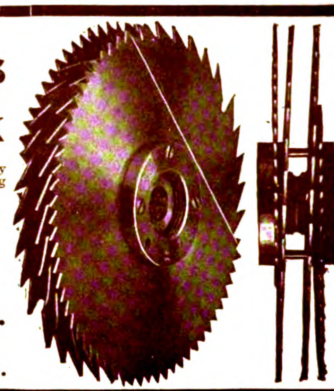
FOX Saw Dado Heads Do Fine, Clean Work

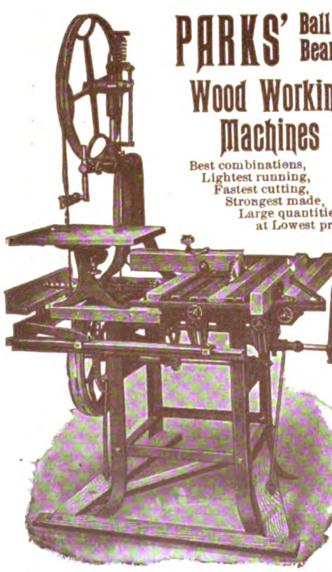
THEY certainly do cut nice, smooth grooves as the "Sample Block" here shown clearly proves. They are noted for their **fast cutting.** Fox Heads have approximately ten times as much spur cutting surface as any other head made. Quick adjustment and perfect safety are other features.



CATALOG explains all.

FOX Machine Co.
387 Front St.,
Grand Rapids, Mich.





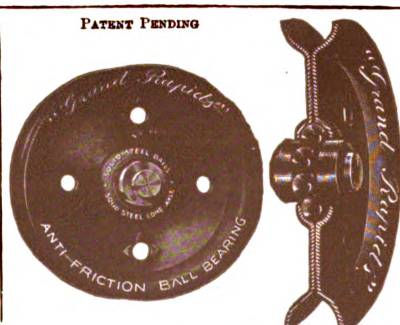
PARKS' Ball Bearing Wood Working Machines

Best combinations,
Lightest running,
Fastest cutting,
Strongest made,
Large quantities,
at Lowest prices

We also build heavier belt power machines either single or combination, Rip Saw, Band Saw or Jointer.

Parks Ball Bearing Machine Company
Sta. A. CINCINNATI, OHIO.
Bournival & Co., St. Barnabe, P. Q., Agents, Canada.

PATENT PENDING



"Ball Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

At prices under the common ordinary goods.

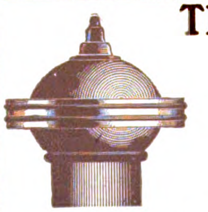
If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash pulley makers in the world. We ship direct or through dealer and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
3 PEARL STREET GRAND RAPIDS, MICH.

THE "GLOBE" VENTILATOR



In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.
Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy N. Y.

THE "GLOBE" IS BUILT ON HONOR AND SOLD ON MERIT

SAVE 25 TO 50% ON NEW LUMBER

MR. CARPENTER and MR. CONTRACTOR:

We want to "put you right," not by advice, but **real live information,** of how you can be the "Low man" in figuring jobs, without slashing your labor bill to pieces.

It's Simple; Here's the Way.

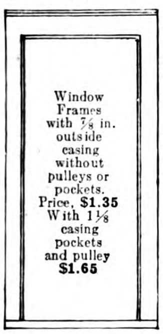
When you figure a job, either get our estimate on a complete bill of material, or figure the items from our Mammoth Catalog that quotes over 50,000 bargains in goods that you daily use. **Hence you have prices 25 to 50 per cent lower** than possible to secure elsewhere, with a binding guarantee of best qualities to satisfy most exacting architect or owner.

Keep in constant touch with us. For our stock is ever changing, as daily we are securing new bargains from

SHERIFFS' SALES — **RECEIVERS' SALES** — **MANUFACTURERS' SALES**

Therefore, it is to your interest to always submit your bills of material for our estimate and **have our Catalog to refer to.** (Send coupon below.)

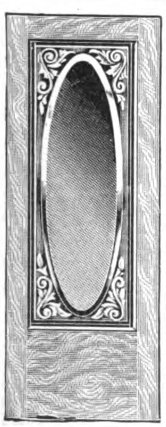
FRAMES SAVE 25% IN FRAMES



Made out of high grade stock only. The Drip Cap and Crown Mould Cap frames we guarantee to have clear outside casings. We ship these frames K. D., but same are cut to size as ordered. Therefore, do not overlook the saving we are making you on labor.

Inside Door Jambs. We can furnish you in any kind of wood to match the balance of your interior trim. Guaranteed to have clear face side, and are sanded and dadoed for head pieces.

Our No. 10-A-100 Window Frame shown herewith, is taken from our catalog as an example of the class of frames which bring us repeat orders from carpenters and contractors.

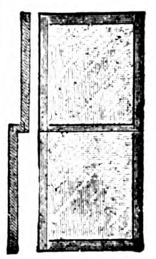


$8.10 FOR THIS BEAUTIFUL FRONT DOOR

Made of soft pine, double "A" quality, strictly first class (our catalog No. 10-A-13) size 3 feet by 7 feet, 1⅜ inches thick, **$8.10.**

In comparing our prices on doors—front doors as well as interior doors—do not overlook the fact that **we do not change or substitute the grade,** but the grades which we specify are strictly in accordance with manufacturer's grading. This means, if we take your order for an "A" grade door, we guarantee to furnish you same. Our catalog explains that we furnish doors of any description and quality.

WINDOWS AT ⅓ OFF



The sash stock used in our windows guaranteed absolutely to be of the very best quality. CLEAR, SOFT PINE, primed in oil. In addition to regular windows, we can also furnish you special designs, such as shown in our catalog, as well as any odd style that you would prefer.

Illustration shows our Two-Light, Check Rail Window, 1⅜ inches thick, catalog No. 10-A-71, size of glass 24x28. Quality strictly guaranteed. Price glazed single strength glass, **$1.05**

STAIRS

Our prices are lower than any other concern. Either ready to be set up (K. D.), or material for stairs only, as you may desire.

When writing us for prices send pencil sketch showing the run of stairs, also height of ceiling, measuring same from floor to floor and stating whether same is to be closed or not.

We can build stairs for you for less money than anybody else, either ready to be set up K. D. or material for stairs only, whichever you prefer. In asking us for prices send pencil sketch, showing the run of stairs, also give full information as to height of ceiling, measuring same from floor to floor, and state whether the stair is to be closed or not.

SPECIAL LUMBER PRICES

FOR NEXT 30 DAYS

Well Seasoned, Dry Stock and Guaranteed up to Specified Grade. All Prices for Standard Lengths 10 to 20 Feet.

SIDING AND CEILING

	Price per 1000 ft.
6 in. Clear Oregon Fir Drop Siding	$29.00
6 in. Select Com. W. P. Novelty Siding	29.00
6 in. C Select Cypress Drop Siding	30.00
6 in. Com. and Better Y. P. Drop Siding	17.00
4 in. D Select W. P. Beveled Siding	13.00
6 in. B Grade Nor. P. Bevel Siding	23.00
4 in. Clear Spruce Bevel Siding	19.00
6 in. No. 1 Cypress Bevel Siding	14.00
4 in. Clear Ga. P. Ceiling Beaded	19.00
4 in. Com. Ga. P. Ceiling Beaded	14.00

SHEATING AND BARN BOARDS

	Price per 1000 ft.
4 in. No. 2 W. P. Roof Sheating D	$15.00
6 in. and wider Y. P. Lining D.	16.00
12 in. 12 to 18 ft. Com. Y. P. Barn Boards	19.00
8. in. and 10 in. No. 1 W. P. Barn Boards	30.00
6 in. No. 2 W. P. D. & M. Sheating	18.00

SHINGLES AND LATH

1 in. by 2 in. W. P. Shingle Lath	$2.45
4 ft. No. 1 N. Soft Pine Lath	3.25
32 in. No. 1 N. Soft Pine Lath	1.50
Com. Star A Star R. Cedar Shingles	2.35
Extra Star A Star W. Cedar Shingles	3.25

DIMENSIONS

	Price per 1000 ft.
2 x 4 — 8 ft. sized — No. 1 P.	$14.00
2 x 4 — 24 ft. Y. P. No. 1 sized	20.00
2 x 6 — 12 ft. Y. P. No. 1 sized	16.00
2 x 6 — 20 ft. Y. P. No. 1 sized	16.00
2 x 12 — 14 ft. Y. P. No. 1 sized	18.00

FLOORING

4 in. Quart. Saw. H. Pine Floor	$29.00
4 in. No. 1 Y. P. Flooring	20.00
3 in. No. 2 Quart. Saw. Ga. P. Floor	16.00
6 in. No. 1 Y. P. Flooring	21.00
6 in. No. 1 W. P. Flooring	29.00
4 in. C and Better W. P. Porch Floor	20.00

Write today for our 500 page Catalog

Illustrates and Quotes "Everything for the Builder"

CHICAGO HOUSE WRECKING CO.

35th and Iron Streets CHICAGO, ILL.

Cut Out This Coupon

Chicago House Wrecking Co., Chicago

I saw your full page advertisement in Carpentry and Building. Send me free of all cost your Large General Catalogue 799. I am interested specially in

----

Name --

Town and County ------------------------------

R.F.D.------P.O.Box------State------------

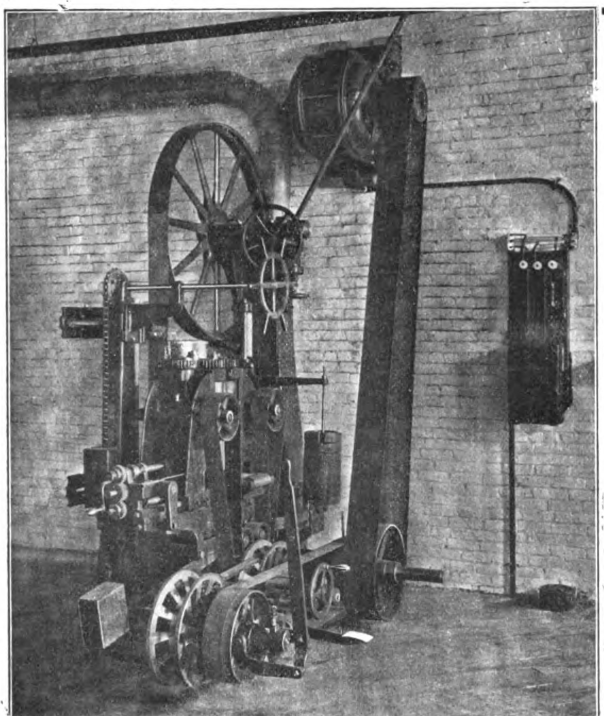


Fig. 502 American 48" Band Re-saw, with Motor, Belt Driven

Also furnished with 44", 54" and 60" Wheels

For full particulars address nearest salesoffice

American Wood-Working Machinery Co.

Executive Office: ROCHESTER, N.Y.

Salesoffices:

NEW YORK: 90 West Street
CHICAGO: Fisher Building
NEW ORLEANS: Canal-La. Bank Bldg.
ROCHESTER: 591 Lyell Avenue
SEATTLE: 401 White Bldg.
PORTLAND, ORE.: 58 First Street
SPOKANE: Paulsen Bldg.
SAN FRANCISCO: 58 Fremont Street

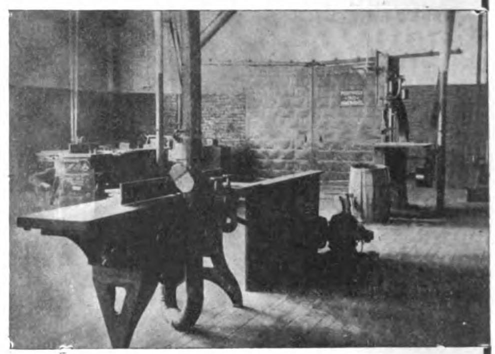
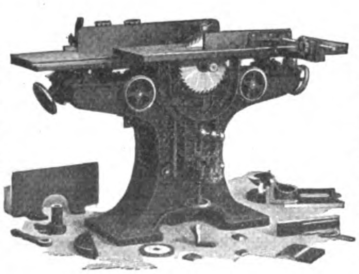


Fig. 801. American Hand Jointer, with Motor, Belt Driven
All sizes, 8", 12", 16", 20", 24", 30" and 36" wide

The Crescent Variety Wood Worker

fills a long felt want in those shops that have varied but limited use for woodworking machinery. It combines a jointer, saw-table, borer, shaper, pole-rounder and tool grinder.



Machine is especially valuable to carpenters, and contractors, as they can take the machine out on a job, or use it in the shop with equal satisfaction. It can be driven with electric motor or gasoline engine.

Get our 1909 catalogue and find out all about this splendid tool and our elegant line of band saws, disk grinders, planers, planer and matcher.

The Crescent Machine Company,

206 Main Street **LEETONIA, OHIO.**

Laying and Finishing Hardwood Floors

BY FRANK G. ODELL

Contains detailed information on the method of floor laying, with hints and cautions to those who aim for best results.

Gives a special chapter on estimating the cost of this class of work.

The increasing demand for finely finished floors, particularly in rural sections where formerly little attention was given to these appointments, means to those engaged in the building trades larger opportunity for employment and profit.

This useful book is supplied at Fifty Cents Postpaid

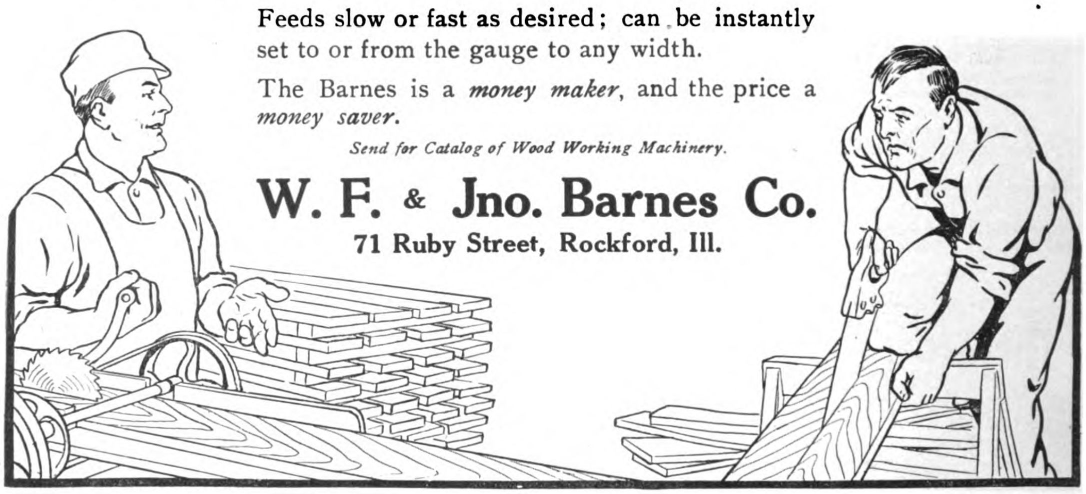
DAVID WILLIAMS COMPANY
14-16 Park Place, New York

Why Don't You Get a Barnes Hand Circular Rip Saw?

Sawing by hand is "backbreaking" work—sawing with our machine prevents the aches, and requires no skill.

One man with a Barnes Hand Circular Rip Saw can easily rip, (line measure) 600 feet of 1 inch pine in an hour, or 6,000 feet in 10 hours.

It will rip boards or planks of either soft or hard wood, of any thickness up to 3¾ inches, and any width up to 19 inches.



Feeds slow or fast as desired; can be instantly set to or from the gauge to any width.

The Barnes is a *money maker*, and the price a *money saver.*

Send for Catalog of Wood Working Machinery.

W. F. & Jno. Barnes Co.

71 Ruby Street, Rockford, Ill.

LUMBER AND PREPARED ROOFING

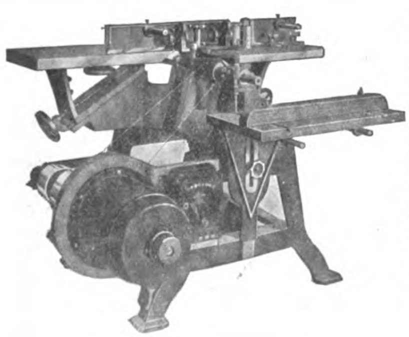
L U M B E R

WE control the output of one of the largest LUMBER MILLS and ROOFING PLANTS in the country. The low price we are placing these two commodities WILL STARTLE YOU, even though you have been buying at what you have thought was the "best price." If you are now building or are preparing to build, don't buy until you have our price. We measure each piece exactly for what it is worth to you as working material. Send us a list of your building requirements in all branches. We refund your money if you are not thoroughly satisfied.

WE ALSO HANDLE MILL WORK, PLUMBING GOODS AND MACHINERY — YOU OUGHT TO HAVE OUR CATALOG

R O O F I N G

Chicago Wrecking & Supply Co. - - St. Louis, Mo.



THE FAMOUS

Universal Wood Worker

With Motor Drive Direct Connected

Especially adapted for the contractor who needs several machines to do his work but is handicapped for space. We build this machine with 10″ and 12″ jointer heads, arranged with the saw table, boring machine, shaper and ⅜″ two side molder, and can also be fitted with the new improved Planing attachment, Hollow Chisel Mortiser and Tenoning attachment. We have a special book which we call our catalogue B, which is ready to send you, and is sent free.

We should also be glad to show you our catalogue of BAND SAWS, SAW TABLES, SHAPERS, BORING MACHINES, SWING SAWS, PLANERS, LATHES and SELF FEED RIP SAWS.

THE SIDNEY TOOL CO.
Sidney, Ohio, U. S. A.

BOOKS

Reference books are indispensable aids to speed and accuracy on the part of the workman. We furnish advice about the best books on all subjects related to the building trades.

DAVID WILLIAMS COMPANY
14-16 Park Place NEW YORK

SUPERINTENDENCE

KIDDER'S, THE ARCHITECTS' AND BUILDERS' POCKET BOOK

Contains a great mass of information, either original or gathered from authoritative sources and reaching into every division of architecture, building and structural engineering. Fifteenth edition, revised. 1700 pages. 1000 engravings. Morocco covers. Gilt edges........$5.00

RICHEY'S, THE BUILDING FOREMAN'S POCKET BOOK AND READY REFERENCE

Especially prepared for foremen, describing clearly the requirements of correct installation and good workmanship in connection with all the different trades. 1118 pages. 656 figures. Morocco covers. Gilt edges $5.00

BUILDING SUPERINTENDENCE

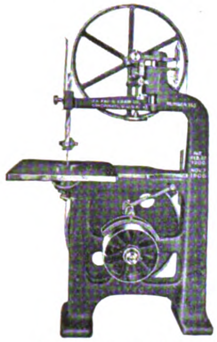
By EDWARD NICHOLS. A good, reliable American book for the guidance of architects, owners, contractors and all interested in building operations and trades. 200 pages. 250 illustrations. Cloth. $1.50

BUILDING CONSTRUCTION AND SUPERINTENDENCE

Part I—Mason's Work. By F. E. KIDDER. 985 pages. 628 illustrations. Cloth. $6.00

David Williams Co., 14-16 Park Place NEW YORK

We Would Suggest



No. 155 Band Saw

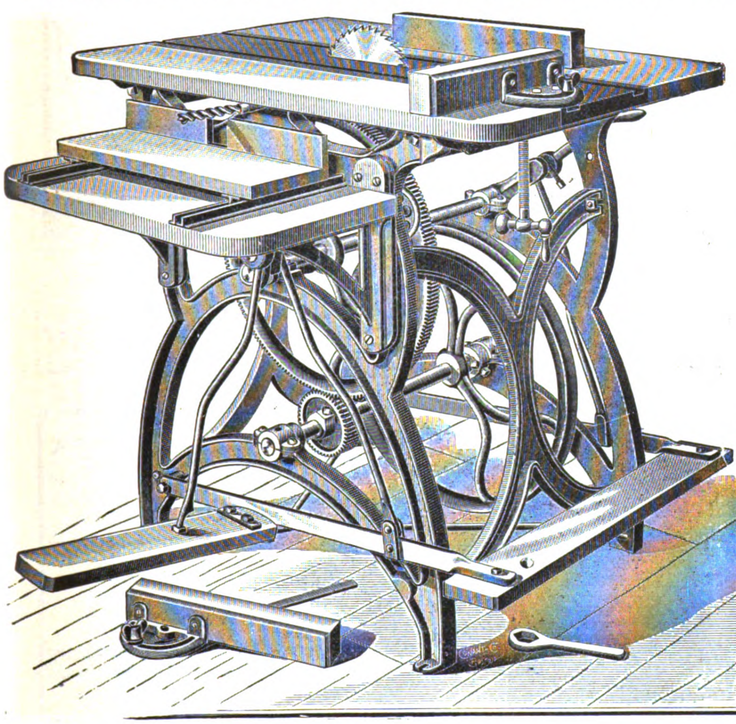
If you are looking for a Small Band Saw, that you send for our descriptive circular showing two large half-tone photographs of our No. 155. This machine will be found very valuable to **Carpenters, Contractors and Retail Lumbermen** because of its thin blade and high speed, two essentials to the rapid and economical production of fine work. It is designed especially for use in shops desiring a small machine that is capable of doing light and medium sawing. With very little power, it will do first-class work.

WRITE TO-DAY

221-241 W. Front Street

J. A. Fay & Egan Co., - Cincinnati, Ohio

Marston's Hand and Foot Power Circular Saw



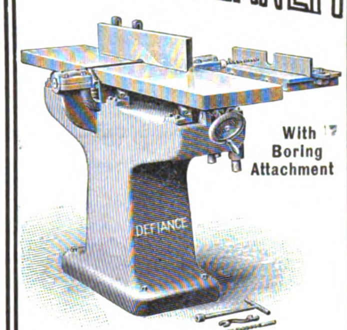
Iron frame 36 inches high.
Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in.
Steel shafts and best babbitt metal boxes.
Gears are all machine-cut from solid iron.

Boring table and side treadle.
Two 7-inch saws and two crank handles with each machine.
Weight complete 350 pounds.
Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

---

12 INCH HAND PLANER



With Boring Attachment

"DEFIANCE" WOOD-WORKING MACHINERY

For making Handles of every kind, Hubs, Spokes, Wheels, Wagons, Carriages, Rims, Shafts, Poles, Neck-Yokes, Single-Trees, Barrel Hoops, Bobbins, Spools, Insulator Pins, Table Legs, Balusters, Oval Wood Dishes and for General Wood Work.

Invented and Built by

THE DEFIANCE MACHINE WORKS
DEFIANCE, OHIO
London Office, 71 Queen St., E. C.

THE IMPROVED Hand and Foot Power **E. F. B.**

SAWING MACHINE

For Carpenters, Builders and all Wood Workers Who Have Shops Without Power

SEND FOR CIRCULAR.

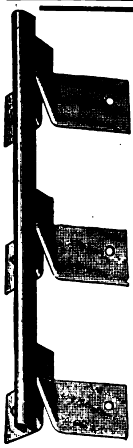
THE BARNES TOOL CO., NEW HAVEN, CONN

DIAMOND EXPANSION BOLTS

Patented

For fastening fixtures, timbers, etc., to brick, stone concrete, or other masonry.
DIAMOND EXPANSION BOLT CO.,
90 West St., corner Cedar, New York N. Y

VANDORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.



SAVES PLASTER—TIME—MONEY

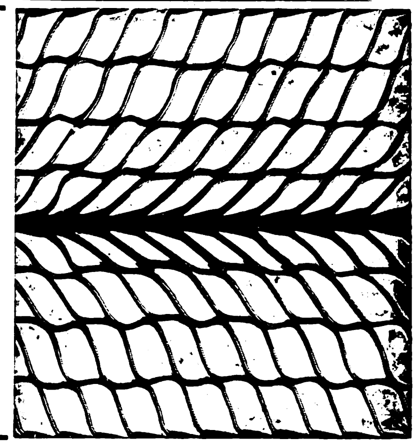
8-X METAL-LATH.

Its little shelves and small mesh require less plaster and give much more support than any other metal lath made. It withstands vibration, is reversible and may be plastered to and from the workman.

CLIM-X CORNER BEAD

Clinches the plaster perfectly. Galvanized and will not rust. Made in one piece with no waste. Lowest priced bead on the market.

THE NATIONAL METAL FABRIC CO.
11 Railroad Sq. Plainville, Conn.
84 Chambers St., New York.



WET PROCESS CONCRETE BLOCKS

By the PETTYJOHN SYSTEM.

The manufacturing of Concrete Blocks is rapidly nearing perfection, but the up-to-date manufacturer must use modern machinery and employ improved methods. Three features are important in perfect block making:

Wet Process Face Down Damp Curing

These splendid features are combined in the new Pettyjohn Invincible Machine and no other. Made in three lengths, 16", 24" and 40". Tandem Invincible makes two blocks at once, price $65.00 and up. Single Invincibles $35.00 and up. Sold on trial always, guaranteed to give satisfaction or money refunded.

With our **TRIPLE TIER RACKING SYSTEM** green blocks can be stacked three high direct from machine with inexpensive home-made rigging. This economizes space, reduces off-bearing distance and above all insures slow, even, damp, perfect curing and bleaching. Plans and blue prints free to customers.

Send for our latest edition of "Stone Making," (just published) a book of valuable data for the block maker—FREE

THE PETTYJOHN COMPANY, - 616 N. 6th Street, Terre Haute, Ind.

THE WINTHROP SOLID TAPERED ASPHALT SHINGLES

Are of a COOL GRAY SLATE COLOR and

Have the durability of asphalt—the fine appearance of slate and the light weight and low cost of wood shingles.

Laid with Regular Shingle Nails, same as wood shingles.

WRITE FOR BOOKLET AND
SPECIAL INDUCEMENTS TO THOSE WHO APPLY
FIRST ROOF IN EACH TOWN.

Winthrop Shingles are fire resisting—weather proof—wind and sun-proof and never crack, break or fall off.

WINTHROP ASPHALT SHINGLE CO. 1103 THE TEMPLE, CHICAGO - ILL.

The Eller Manufacturing Co.

CANTON, OHIO.

New York Office and Warehouse, 29-31 Lexington Avenue.

Makers of

Eller's "Perfect—Fit" Steel Ceilings

Send for Catalogue

Also manufacturers of Cornices and Skylights, Eaves Trough and Conductor Pipe, Metal Roofing, Tin Plate, and Lock Joint Metal Shingles.

IF you want to know how to prepare your own blue prints use our pamphlet

BLUE PRINT MAKING

It contains two practical articles on making blue prints, together with other matter relating to the process from correspondents to *Carpentry and Building*.

Each of the articles is complete in itself, giving solutions for coating paper together with directions for making prints of various kinds.

The construction of the printing frame is also illustrated and described.

28 pages. Price, postpaid, 25 cts.

DAVID WILLIAMS CO.
14-16 Park Place, N. Y.

The Payton Building, Spokane, Wash. Equipped with Mullins Metal Fire Proof Windows.

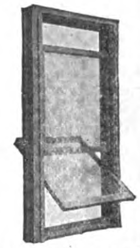
"An Ounce of Prevention"

It is easier to *prevent* a disastrous fire than it is to *stop one.*
The weak point in all buildings is through the windows.
These openings can be made as fire proof as the walls themselves by installing *Mullins Fire Proof Windows.*

MULLINS

FIRE PROOF —— STORM PROOF —— DUST PROOF

WINDOWS



have successfully withstood the severest trials not only in factory experiments but in actual conflagrations.

Mullins Windows are perfect windows in every way. Entire lock-seamed metal with no soldered joints in frame, sill or sash. They cannot warp or buckle and are not affected by heat, expansion or contraction.

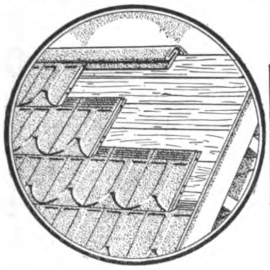
The Peyton Building of Spokane, Washington, shown herewith, is one of the many hundred of modern fire proof buildings equipped with Mullins Windows.

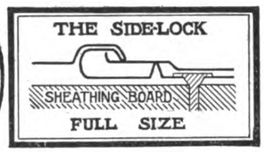
Mullins Fireproof Windows are manufactured under the supervision of *Underwriters' Laboratories, Inc.,* according to the latest specifications of the *National Board of Fire Underwriters,* and *every window is inspected, approved and labeled* with their *official label.*

We have catalogues showing our various lines of product. Please specify the particular class of sheet metal work you are interested in and we will send you the proper catalog for the same.

W. H. Mullins Company, 208 Franklin Street, Salem, Ohio

THE SIDE-LOCK OF





CORTRIGHT METAL SHINGLES

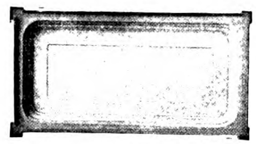
And the overlap insure a building from any damage by rain or snow, for the roof is **locked together** and is **absolutely stormproof.** They're fireproof too, and last as long as the building without needing repairs

And as time goes on wins the favor of your clients, it makes them stick to you. This is in addition to the profit you make, which is undoubtedly larger than you could make handling any other roofing, for Cortright Metal Shingles are so easily laid that any handy man can do the job and do it right.

Send for our free book, "Rightly Roofed Buildings," and learn about them.

CORTRIGHT METAL ROOFING COMPANY
PHILADELPHIA and CHICAGO

Lock Joint Metal Ceilings



The joints are locked, not slipped together. The only absolute Lock Joint Ceiling manufactured.

A permanent construction, simple and economical in erection.

Send for Catalog "F."

S. KEIGHLEY METAL CEILING AND MANUFACTURING CO.

**Boston
Brooklyn
Baltimore
Washington**

PITTSBURGH, PA.

PRODUCERS OF

ROOFING SLATE

SLATE BLACKBOARDS

THE E. J. JOHNSON CO.
38 Park Row, New York.
Quotations delivered anywhere.
Slaters' Supplies
Snow Guards
Correspondence Solicited

IRON AND WIRE FENCES

Catalog Free High Grade For All Purposes

ENTERPRISE FOUNDRY AND FENCE COMPANY 201 South Senate Avenue, Indianapolis, Ind.

"STAR ENCAUSTIC TILE CO."

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street near 61st.

PITTSBURG, PA.

Copper Weather Vanes

All sizes and designs.

E. G. Washburne & Co.

46 CORTLANDT ST., - NEW YORK.

SEND FOR CATALOGUE.

USEFUL BOOKS

USEFUL Books are published on many of the industrial branches. Mention the subject you are investigating or want to be better advised upon to

DAVID WILLIAMS CO., 14-16 Park Pl., New York.

Best Books on ESTIMATING

They give important service in calculating with accuracy the cost of material, labor and construction on building enterprises. Their possession means a saving of time and money to building contractors.

The New Building Estimator

BY WILLIAM ARTHUR.

This is an exhaustive book of representative building costs, and information for estimators.

437 *Pages; with a 13-Page Cross-Reference Index. Handbook Size. Cloth. Price,* $2.50.

The Estimator's Price Book and Pocket Companion

BY I. P. HICKS.

A handy combined price and cost memoranda book, with price lists and ruled spaces for entering additional matter.

672 *Pages; Pocket Size; Cloth. Price,* $1.00.

Modern Estimators' and Contractors' Guide for Pricing Builders' Work

BY F. T. HODGSON.

Contains explanations of various reliable ways of estimating and pricing builders' work, showing in concise form a variety of methods employed by successful contractors.

300 *Pages; Freely Illustrated; Cloth. Price,* $1.50.

Hicks' Builders' Guide

BY I. P. HICKS.

Presents a simple system of estimating materials and labor chiefly as applied to suburban residential work. Contains also a complete treatment on framing roofs of all descriptions.

166 *Pages;* 114 *Illustrations; Cloth. Price,* $1.00.

Estimating Frame and Brick Houses

BY F. T. HODGSON.

Very methodical, taking up step by step the cost of constructing frame and brick dwellings, from excavation to finish, with average rates and figures quoted. A feature is a valuable chapter of 32 pages giving "handy rules for the estimator."

224 *Pages; With Scale and Other Illustrations; Cloth. Price,* $1.00.

Estimating

BY EDWARD NICHOLS.

Tells how to go about making an estimate intelligently. As a practical example, a complete plan of a house is given and the estimates of cost are worked out from this, with bills of material and working data.

149 *Pages; Cloth. Price,* $1.00.

Sent Prepaid on Receipt of Prices

DAVID WILLIAMS CO.

14-16 Park Place :: New York

Granite ROOFING

TRADE MARK

This great pier was roofed seven years ago with **Granite Roofing.** At the present time it shows no signs of wear, and is expected to give excellent satisfaction, without attention or repairs, *for at least ten years longer.* Unlike the ordinary ready roofing, which is adapted only for temporary buildings and sheds, **Granite Roofing** may be economically used on all kinds of structures. Its unusual weight, 140 lbs. to the roll, gives to this roofing *unparalleled durability.* It can be laid by any one who can handle a hammer. **Granite Roofing** has a surface of sea-grit, thoroughly imbedded into its composition, which makes it fireproof and takes the place of the paint or coating.

Send for free Sample and Booklet, and learn about this best of all roofings.

EASTERN GRANITE ROOFING CO.

CHICAGO 19 Battery Place, New York ST. LOUIS

MONTROSS METAL SHINGLES

Carpenters and Builders who want more business and increased profits, should lay

MONTROSS METAL SHINGLES

They make pleased customers, who speak well of your work, which greatly helps you to get more business. Manufactured over twenty years. No experiment. Giving satisfaction on buildings where first laid. Fire, Storm, Lightning-proof. Ornamental, Inexpensive and outlast all other roofings. Embossed, then galvanized or painted. Write for catalogue giving prices, discounts and full information. **Address 108 Erie Street.**

MONTROSS METAL SHINGLE CO. CAMDEN, NEW JERSEY.

ELEVATORS (STORE) COMPLETE FOR 105

Ready to erect, simple in construction, easily cared for, other styles and prices to suit

THE WARNER ELEVATOR MFG. CO., 2100 Valley St CINCINNATI OHIO

ELECTRIC ELEVATORS, NEW YORK OFFICE, 1183 BROADWAY

Made by the Hundred Birmingham, Ala. Woodward Building.

For Every Hoisting Need

where steam, water or electrical power is either too costly or not to be had at all, there is an

OTIS Hand Power Elevator

Installation—at smallest cost.
Maintenance—most economical.
Operation—greatest simplicity and ease.

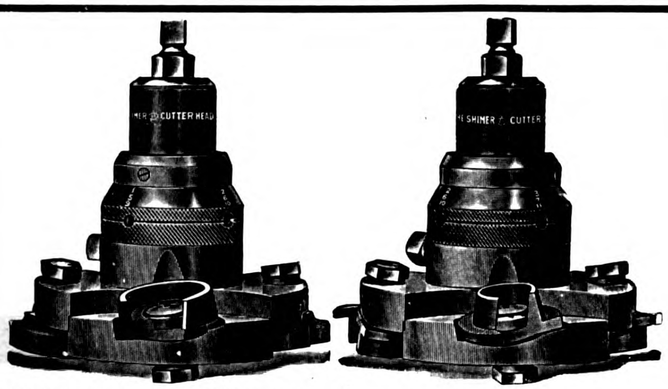
Store, Factory, Warehouse and Stable Elevators.

Capacity as high as 2,500 lbs. Made amply strong to cover widest margin of safety. Equipped with Modern Safety Devices. Covered fully by the Otis guarantee.

Send for Catalogue K-10.

OTIS ELEVATOR COMPANY

Offices in all the Principal Cities of the World.



BETTER RESULTS

The Shimer System of Tools paves the way to better results and larger profits. Wherever you find this system in use you will find as a result a higher grade of work and a higher degree of satisfaction to the operator.

THE SHIMER CUTTER HEADS for Flooring, Ceiling, Siding, Wainscoting Ship Lap, O. G. Batten, etc., are all made upon the interchangeable plan. Each is made in a separate Head, used interchangeably to meet the conditions of frequent changes, which is accomplished in less time and with less labor and expense. To remove one class of Head from the machine spindles and replace with another is but momentary, the vertical adjustments of the Head remaining unchanged. The system is very economical on account of its time and labor-saving features.

If you have work, regular or special, to get out in quantity it will pay to have a Shimer Cutter Head made to do the work. Our fire-proof vaults contain many thousands of samples and drawings of this kind which we have turned out in the past for our customers.

The expense that enters into the every day make-ready of the old straight cutters is a thing of the past the minute you begin the use of the Shimer Cutter Heads.

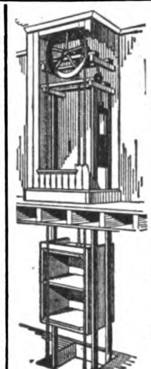
A very clear description is given in our latest Catalogue, a copy of which we will be pleased to mail you. Address

SAMUEL J. SHIMER & SONS -:- MILTON, PENNSYLVANIA

Roofing Slate
Slate Blackboards

Send for Prices

THE EASTON SLATE VAULT CO., Easton, Penna.



Dumb Waiters and Hand Elevators

Of the most improved automatic construction

Invalid Lifts
Trunk, Carriage
Sidewalk and
Freight Elevator

Sedgwick Machine Works
Poughkeepsie, N. Y.
AND
128 Liberty St., New York

Catalogs and Estimates Furnished. See Sweet's Index.

Improved Quick and Easy Rising
Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St.
Branch Offices:
120 Cedar St. New York. 108 11th St., Omaha, Neb.

THERE are still many thousands of young carpenters who are missing the benefits of that handy and indispensable book

HICKS' BUILDERS' GUIDE

It contains, firstly, a very practical system of estimating labor and materials, showing *how to figure in almost every detail of building construction*, including carpenters' work, masonry, plastering, hardware, painting, etc. A section is given to *the geometrical measurement of roof surfaces*. with numerous illustrations and examples covering roof framing of every description; also contains a chapter on mitering, planceers, molding, etc., describing the making of many troublesome joints.

160 Pages, 114 Illustrations.
One Dollar Postpaid.

DAVID WILLIAMS CO.
14-16 Park Place, N. Y

STANDARD MINERAL WOOL

LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.

Room 918, 112 Clark Street, CHICAGO

Samples and Circulars Free

$1.00 Good For $1.00

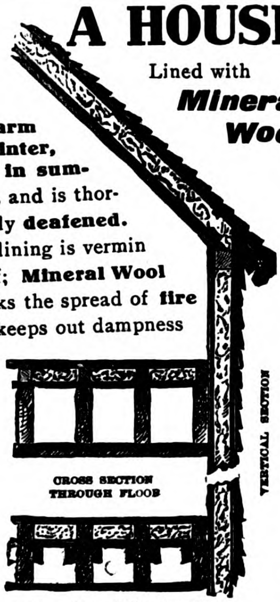
This advertisement is good for $1.00 in payment for any Self-setting Plane if the balance of the list price of a plane is sent with this ad., if sent from where our planes are not sold. If the plane is returned at our expense within sixty days of this date, we will refund $1.00 more than you sent for the plane. Circular, pencil and 4" rule free if you mention this paper and send address of ten carpenters.

GAGE TOOL COMPANY

December 1st, 1909. VINELAND, N. J.

A HOUSE

Lined with ***Mineral Wool*** is **warm in winter, cool in summer,** and is thoroughly **deafened.** The lining is vermin proof; **Mineral Wool** checks the spread of **fire** and keeps out dampness



Sample and Circular Free.

U. S. MINERAL WOOL CO.,

140 Cedar St., New York.

STAR EXPANSION BOLTS

The quickest, easiest, safest and neatest way to make a fastening!

What one man says:—

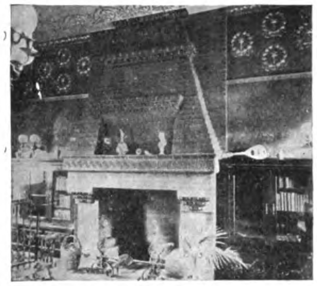
"I am a building contractor and specify the use of **Star Expansion Bolts** in making fastenings of any nature, from fire escapes to electric light switches. At home my towel racks, glass and tooth brush holders and all electric fixtures are fastened with **Star Screw Anchors.** In selecting the **Star** I am positive I get the best bolt on the market."

Ten thousand voluntary testimonials, similiar to the above, prove the **Star** to be the fittest.

Samples and full information for you to-day.

STAR EXPANSION BOLT CO.,

147-149 Cedar St., New York City.



ORNAMENTAL BRICK MANTELS

OURS ARE UNEXCELLED for beauty of finish, artistic effect, durability and comfort. ***We make them in all styles, at all prices, in various colors.***

When you build or remodel **send for our Illustrated Photo Catalog of 67 Original Designs.**

Phila. and Boston Face Brick Company

P. O. Box 8613

Office and Showroom, 165 Milk St.

Boston, Mass.

OUR FINE HARDWOOD FLOORING

SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS

We have our own saw mill and timber tracts and two factories.

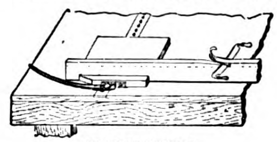
Send for our trade discounts and our design Book No. 5.

WOOD-MOSAIC FLOORING CO.

ROCHESTER, N. Y. NEW ALBANY, IND.

"Pullman" Automatic Bench Vise

FOR CARPENTERS AND CABINET MAKERS



PATENTS PENDING

This is the ONLY VISE on the market that will automatically hold the work on the TOP OF BENCH.

MADE BY

Pullman Mfg. Company,

Makers of Spring Sash Balances and Hardware Specialties.

Sophia Street, ROCHESTER, N.Y

"THE TOOL-MONGER"

¶ Name given to a booklet of 288 pages which we shall be pleased to mail on request. Valuable to all users of Mechanics' tools.

Montgomery & Co., 102 Fulton St., N. Y. City

THE WORKS OF F. E. KIDDER ON BUILDING CONSTRUCTION

BUILDING CONSTRUCTION AND SUPERINTENDENCE:

Part I—Mason's Work. Revised and Enlarged by Thomas Nolan. 965 Pages. 625 Illustrations. Cloth **$6.00**

Part II—Carpenter's Work. 544 Pages. 524 Illustrations. Cloth **$4.00**

Part III—Trusses, Roofs and Roof Trusses. 300 Pages. 306 Illustrations. Cloth **$3.00**

ARCHITECTS' AND BUILDERS' POCKET BOOK. Fifteenth Edition Revised. 1700 Pages. 1000 Engravings. Leather cover **$5.00**

CHURCHES AND CHAPELS. Third Edition Revised. 120 Illustrations in the text and upward of 50 full-page plates. Cloth (oblong) **$3.00**

STRENGTH OF BEAMS, FLOORS AND ROOFS. 230 Pages. 164 Illustrations. 21 Reference Tables. Cloth **$2.00**

Sent Prepaid on Receipt of Price.

DAVID WILLIAMS COMPANY

14-16 Park Place, - - - - NEW YORK

Which Way Do YOU Scrape Floors?

The **old way** of scraping floors by **hand** is not only hard, tiresome, back-breaking work, but it requires about four times as much time as the **new way**—using a "Little Giant" Floor Scraper.

The **old way** a man could scrape about **two** squares in eight hours. The **new way** he can scrape **eight** squares in eight hours and scrape right up close to the base board, When through scraping he can point to his work with pride.

We've sold over 20,000 "Little Giant" Floor Scrapers on conditions — the conditions are: If not **satisfactory in every way** — ship it back at our expense.

We'll send one free to you on trial and **pay the freight.** That's meeting you **half way**—will you meet us **half way?** Let us quote you our SPECIAL price.

THE NEW WAY
Eight Squares in Eight Hours

REMEMBER—No contractor, however small, can afford to be without this great time, labor and money saver.

THE OLD WAY
Two Squares in Eight Hours

We also manufacture Electric Home Laundry Machines

Hurley Machine Company

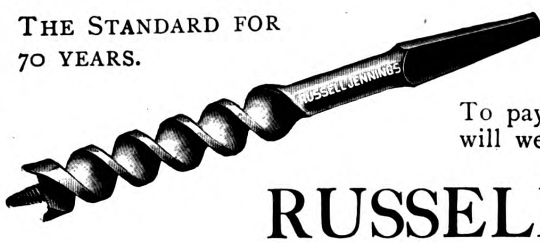
Manufacturers of High-Grade Mechanical Specialties

CHICAGO 23 to 39 South Clinton St.

NEW YORK 1010 Flatiron Building

SAN FRANCISCO: 71 First St.

THE STANDARD FOR 70 YEARS.



IT'S CHEAPER

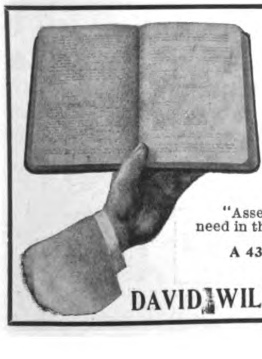
To pay a little more and get a bit that will wear much longer. The

RUSSELL JENNINGS

is made of Genuine Crucible Steel. Cuts a smooth hole long after cheaper bits are worn out.

RUSSELL JENNINGS MANUFACTURING CO., Chester, Conn., U. S. A.

21-4



The New Building Estimator

An Indispensable Aid to Contractors

It relates to all classes of building construction and equipment, with helpful analysis, and with material, labor and time figured in full detail.

"Assembles a surprisingly large amount of cost data and fills a real need in the contracting field."—*American Architect.*

A 437-Page Handbook with a 13-Page Cross-reference Index. Price, $2.50, Delivered.

DAVID WILLIAMS CO., 14-16 Park Place, NEW YORK

CARPENTERS

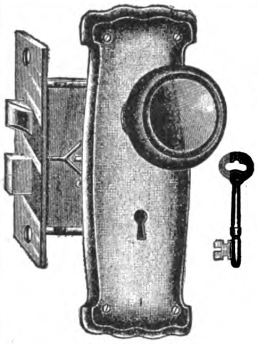
We have a first class winter job to offer one carpenter in each locality in the United States. Easy, pleasant and profitable work in his home town. Some of our carpenters make as high as $20.00 every day during the winter when most carpenters are idle. Any carpenter can make $10.00 a day and the work is easy. Be sure and write us at once to secure the job. We are large manufacturers and guarantee all we say.

J. A. BENNETT & SONS CO.,
302 Main St., Gouverneur, N. Y.

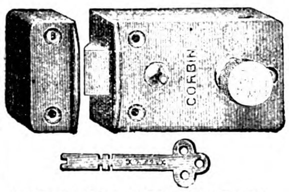
ALPHABETICAL LIST OF ADVERTISERS

CLASSIFIED LIST OF ADVERTISERS

BUILDERS' HARDWARE
PRICES SMASHED!

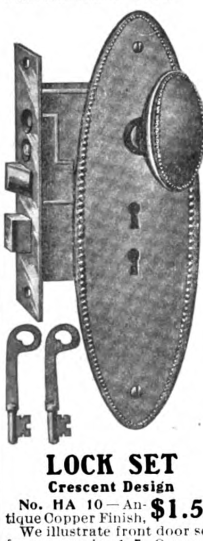


Gordon Design
INSIDE LOCK SET
No. HA 148—Size lock 3⅝x3¼ in. Escutcheon and knobs wrought steel. Antique copper finish. Complete with screws Per Set...... **38c**



RIM NIGHT LATCH
No. HA 85—2x3 in. For door ⅞ in. to 1¾ in. thick. Japanned brass plated. Stop-knob dead-locks latch against key. Reversible for right or left hand doors. Per Set...... **30c**

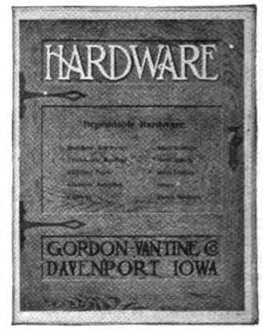
PADLOCKS
No. HA 88—1½ in. all brass, spring shackle, self locking. Each **10c**



LOCK SET
Crescent Design
No. HA 10—Antique Copper Finish, **$1.55**
We illustrate front door set, face measuring 1x7. Our most popular design. Inside Door Set, same pattern, **49c**

Get Our Latest Catalog of Astonishing Bargains

Every Page Means Dollars of Savings to You!



The prices are way below what your local dealer charges you, and the articles are the very latest improved styles in every finish. This catalog is a veritable treasury of bargains, everything you need in building hardware for houses, barns and structures of all kinds. Big saving in builders' hardware.

Put the Dealer's Profit in Your Own Pocket

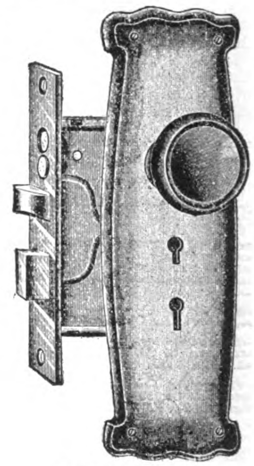
Save From 25% to 50% on Supplies

The Gordon-Van Tine Co. has a reputation from Portland, Maine, to Portland, Oregon, for lowest prices and most dependable values. Just look over a few of the items shown on this page, and then think what you have to pay elsewhere. Figure up what this means on the whole house. See what you save on Lock Sets, Hinges, Sash Lifts, Butts, Knobs, Latches and the hundreds of other trimmings and hardware you need. The difference will surprise you.

Get the Gordon-Van Tine Co. catalog and you won't have to guess what your profits will be. You can figure closer and make more money on every job, whether you are building for yourself or someone else. By placing our orders in gigantic lots we are able to buy below any one else, and you get the benefit.

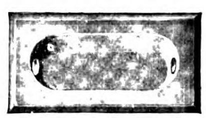
Every Contractor, Builder and Farmer Should Have Our Books To Go By

Write for our "Hardware" catalog showing hundreds of items from Bolts to Building Paper, Nails, Screws, Locks, Ladders, Glass, Paint, Hinges, and everything you can think of or require. It may save you from $10 to $100 on a single order. At the same time we will send you Grand Free Builders' Catalog of 5,000 Big Bargains in Building Material, Sash, Doors, Mouldings — everything needed for building or repairing.



LOCK SET
No. HA 70—Colonial design. Dull brass finish. Beautiful design. Mortise lock 5x3½ in. wrought steel case front and strike. Night latch and dead bolt, **$1.76**
Cut shows front door set. Inside **No. HA 71**, same design, lock 3¼x3⅛.................. **57c**

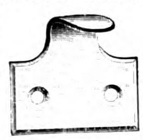
Strap Hinges
No. HA 111 Price each **4c**
3-in. hinge of standard gauge wrought steel. A genuine bargain.



FLUSH SASH LIFT Antique Copper Finish.
No. HA 33 with screws. Each, **5c**
Per dozen, **50c**

Sash Fastener
No. HA 34—Antique Copper, with screws to match. Price each, **5c** By the dozen, **55c**

Hook Sash Lift
No. HA 32—Antique Copper Finish, including screws..... each, **2c**
Per dozen, with screws, **20c**



Cupboard Turns
No. HA 31—Wrought Steel Antique Copper Finish, including screws, Each **12c**

Loose Pin Butts
No. HA 24—Ball tipped and reversible Antique Copper Finish, with screws 3½x3½. Price, pair.... **17c**

We Will Fill Orders Direct From This Page

Send us a trial order from this advertisement. We guarantee absolute satisfaction, or your money instantly refunded. Everything is bright and new. You will make no mistake, no matter how large your order. Our guarantee is good as gold.

Write for Books Today. We Will Mail Them FREE

With the new Gordon-Van Tine Hardware Catalog and the Grand Builders' Catalog of 5,000 Bargains in Building Material before you, you can tell to a penny how much you can save, whether you are building a modest cottage or a palatial residence. Thousands of pleased customers are constantly re-ordering. Write for the catalogs today.

GORDON-VAN TINE COMPANY
505 Federal Street :: DAVENPORT, IOWA

Grinding and Polishing Machines, Hand and Power
Cleveland Stone Co., Cleveland, O.
Richards Mfg. Co., Aurora, Ill.
Robertson Mfg. Co., Buffalo, N. Y.

Grooving Heads
Fox Machine Co., Grand Rapids, Mich.

Hammock Hooks
National Mfg. Co., Sterling, Ill.

Hangers, Barn Door
Lane Bros. Co., Poughkeepsie, N. Y.
National Mfg. Co., Sterling, Ill.
Ney Mfg. Co., Canton, O.
Richards Mfg. Co., Aurora, Ill.

Hangers, House Door
Lane Bros. Co., Poughkeepsie, N. Y.
National Mfg. Co., Sterling, Ill.
Richards Mfg. Co., Aurora, Ill.

Hardware Specialties
Richards Mfg. Co., Aurora, Ill.
White, Van Glahn & Co., 14 Barclay St., New York.

Hinges
National Mfg. Co., Sterling, Ill.
Stanley Works, New Britain, Conn.
Zimmerman, Harry, & Co., Fremont, Ohio.

House Plans
Comstock, Wm. T., 23 Warren St., New York.

Iron, Planished Sheet
American Sheet & Tin Plate Co., Pittsburgh, Pa.

Iron Work
Van Dorn Iron Works Co., Cleveland, O.

Joist Hangers, Steel
Lane Bros. Co., Poughkeepsie, N. Y.

Knobs, Drawer
Waddell Mfg. Co., Grand Rapids, Mich.

Levels
Baker, McMillen Co., Akron, O.
Bostrom-Brady Mfg. Co., Atlanta, Ga.
Calhoon, A. O., & Co., Perry, Mo.

Lightning Rods
Washburn, E. G. & Co., 46 Cortlandt St., New York.

Lumber and Shingles
Chicago House Wrecking Co., Chicago, Ill.
Chicago Wrecking & Supply Co., St. Louis, Mo.
Lestershire Lumber & Box Co., Lestershire, N. Y.

Mantels
Foster-Munger Co., Chicago, Ill.
French, Sam'l H. & Co., Philadelphia, Pa.
Ostendorf, W. H., Philadelphia, Pa.
Phila. & Boston Face Brick Co., Boston, Mass.

Mantels, Combination
Burritt, A. W., Co., Bridgeport, Ct.

Mechanics' Tools
Montgomery & Co., 102 Fulton St., N. Y.

Mill Work
Gordon, Van Tine & Co., Davenport, Iowa.
Schaller-Hoerr Co., Chicago, Ill.

Mineral Wool
Columbia Mineral Wool Co., Chicago, Ill.
U. S. Mineral Wool Co., 140 Cedar St., New York.

Miter Boxes
Dosch Mfg. Co., Bridgeport, Ct.
Goodell Mfg. Co., Greenfield, Mass.
Marsh, H. C., Co., Rockford, Ill.
Nicholls Mfg. Co., Ottumwa, Ia.

Miter Machines
Fox Machine Co., Grand Rapids, Mich.

Moldings
American Column Co., Battle Creek, Mich.
Schaller-Hoerr Co., Chicago, Ill.
Waddell Mfg. Co., Grand Rapids, Mich.

Mortar Colors
French, Sam'l H. & Co., Philadelphia, Pa.

Mortisers, Hand
Miller, Albert W. Mfg. Co., Cincinnati, O.

Ornamental Sheet Metal Work
Mullins, W. H. Co., Salem, O.

Paint
Chicago Wrecking & Supply Co., St. Louis, Mo.
Eastern Granite Roofing Co., Irving Bldg., New York.
French, Samuel H., & Co., Philadelphia, Pa.
Schaller-Hoerr Co., Chicago, Ill.
Standard Paint Co., 100 William St., New York.

Paint and Varnish Softeners
Johnson, S. C. & Son, Racine, Wis.

Parquette Flooring
Interior Hardwood Co., Indianapolis, Ind.
Johnson, S. C., & Son, Racine, Wis.
Wood-Mosaic Flooring Co., Rochester, N. Y.

Pencils
Dixon, Jos. Crucible Co., Jersey City, N. J.

Pipe and Fittings
Chicago Wrecking & Supply Co., St. Louis, Mo.

Planes
Gage Tool Co., Vineland, N. J.
Ohio Tool Co., Columbus, O.
Smith, Otis A., Rockfall, Ct.

Protractors
Calhoon, A. O., & Co., Perry, Mo.

Radiator Shields
Foster, Wm., & Sons Co., Springfield, Ill.

Reflectors
Frink, I. P., 551 Pearl St., New York.

Registers
Hess Warming & Ventilating Co., Chicago, Ill.

Roofing, Art Metal Tile
Mullins, W. H. Co., Salem, O.

Roofing and Siding
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Asphalt Ready Roofing Co., 136 Water St., New York.
Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Chicago Wrecking & Supply Co., St. Louis, Mo.
Eastern Granite Roofing Co., Irving Bldg., New York.
Edwards Mfg. Co., Cincinnati, O.
Gordon, Van Tine & Co., Davenport, Iowa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Roofing Co., Tonawanda, N. Y.
Schaller-Hoerr Co., Chicago, Ill.
Standard Paint Co., 100 William St., New York.
White, Van Glahn & Co., 14 Barclay St., New York.
Winthrop Asphalt Shingle Co., Chicago, Ill.

Roofing and Siding, Metal
Eller Mfg. Co., Canton, O.

Roofing Brackets
Stanley Rule & Level Co., New Britain, Ct.

Roofing Paint
Asphalt Ready Roofing Co., 136 Water St., New York.
Dixon, Jos. Crucible Co., Jersey City, N. J.
Eastern Granite Roofing Co., Irving Bldg., New York.
Standard Paint Co., 100 William St., New York.

Roofing Slate
Easton Slate Vault Co., Easton, Pa.
Johnson, E. J. Co., 38 Park Row, New York.

Sash Balances
Caldwell Mfg. Co., Rochester, N. Y.
Pullman Mfg. Co., Rochester, N. Y.

Sash Chains
Morton, Thomas, 181 Lafayette St., New York.
Pullman Mfg. Co., Rochester, N. Y.
Smith & Egge Mfg. Co., Bridgeport, Ct.

Sash Cord
Samson Cordage Works, Boston, Mass.
Silver Lake Co., Boston, Mass.

Sash Locks
Ives, Hobart B. Co., New Haven, Ct.
National Mfg. Co., Sterling, Ill.

Sash Locks, Ventilating
Pullman Mfg. Co., Rochester, N. Y.

Sash Pulleys
Bridgeport Sash Pulley Co., Grand Rapids, Mich.
Grand Rapids Hardware Co., Grand Rapids, Mich.

Sashes
Foster-Munger Co., Chicago, Ill.
Gordon, Van Tine & Co., Davenport, Iowa.
Lestershire Lumber & Box Co., Lestershire, N. Y.

Saw Clamps
Disston, Henry & Sons, Philadelphia, Pa.

Saw Filing Guide
Disston, Henry & Sons, Philadelphia, Pa.

Saw Jointers
Crescent Machine Co., Leetonia, O.

Saw Oiler
Schuring Bros., Washington, D. C.

Saw Sets
Taintor Mfg. Co., 113 Chambers St., New York.

Saw Tables
American Wood Working Machinery Co., Rochester, N. Y.
Barnes Tool Co., New Haven, Conn.
Cordesman, Meyer & Co., Indianapolis, O.
Crescent Machine Co., Leetonia, O.
Defiance Mch. Works, Defiance, O.
Fay, J. A., & Egan Co., Cincinnati, O.
Kidder, R. E., Worcester, Mass.
Marston, J. M., & Co., Boston, Mass.
Sidney Tool Co., Sidney, O.

Saws
Bishop, Geo. H., & Co., Lawrenceburg, Ind.
Disston, Henry & Sons, Philadelphia, Pa.
Hammacher, Schlemmer & Co., 4th Ave. and 13th St., New York.
Jennings, C. E. Co., 42 Murray St., New York.
National Saw Co., Newark, N. J.
Simonds Mfg. Co., Fitchburg, Mass.

Schools
American School of Correspondence, Chicago, Ill.
International Correspondence Schools, Scranton, Pa.

Screw Drivers
North Bros. Mfg. Co., Philadelphia, Pa.

Sheet Metal
Mesker & Bro., St. Louis, Mo.

Sheet Metal Fronts
Mesker & Bro., St. Louis, Mo.

Sheets, Black and Galvanized
Milwaukee Corrugating Co., Milwaukee, Wis.

Sheets, Iron and Steel, Plain and Galvanized
American Sheet & Tin Plate Co., Pittsburgh, Pa.

Shingle Stains
Cabot, Samuel, Boston, Mass.

Shingles and Tiles, Metallic
Chattanooga Roofing & Foundry Co., Chattanooga, Tenn.
Cortright Metal Roofing Co., Philadelphia, Pa.
Montross Metal Shingle Co., Camden, N. J.
National Sheet Metal Roofing Co., Jersey City, N. J.

Shingles, Asphalt
Winthrop Asphalt Shingle Co., Chicago, Ill.

Show Cases
Detroit Show Case Co., Detroit, Mich.

Shutter Worker
Mallory Mfg. Co., Flemington, N. J.

Shutters
(See Blinds.)

Skylights
Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Chattanooga Roofing & Fdry. Co., Chattanooga, Tenn.
Edwards Mfg. Co., Cincinnati, O.
Eller Mfg. Co., Canton, O.
Foster, Wm., & Sons Co., Springfield, Ill.
Mesker & Bro., St. Louis, Mo.
Milwaukee Corrugating Co., Milwaukee, Wis.
Mullins, W. H. Co., Salem, O.

Slaters' Tools
Belden Machine Co., New Haven, Conn.

Speaking Tubes
Ostrander, W. R., & Co., 22 Dey St., New York.

Squares
Calhoon, A. O., & Co., Perry, Mo.
Nicholls Mfg. Co., Ottumwa, Ia.

Store Fronts
Detroit Show Case Co., Detroit, Mich.

Store Ladders, Rolling
Lane Bros. Co., Poughkeepsie, N. Y.

Strap Hinges
Zimmerman, Harry, & Co., Fremont, Ohio.

Structural Iron and Steel Work
Chicago House Wrecking Co., Chicago, Ill.
Mesker & Bro., St. Louis, Mo.

Structural Slate
Johnson, E. J. Co., 38 Park Row, New York.

Tackle Blocks, Automatic
Lane Bros. Co., Poughkeepsie, N. Y.

Tiling
Ostendorf, W. H., Philadelphia, Pa.
Star Encaustic Tile Co., Pittsburgh, Pa.

Tin and Terne Plate
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Canton Art Metal Co., Canton, O.
Milwaukee Corrugating Co., Milwaukee, Wis.

Tin Roll Roofing
American Sheet & Tin Plate Co., Pittsburgh, Pa.

Tool Cabinets
Hammacher, Schlemmer & Co., 4th Ave. & 13th St., New York.

Tool Chests
Jennings, C. E. Co., 42 Murray St., New York.

Tool Grinders, Hand Power
Robertson Drill & Tool Co., Buffalo, N. Y.

Tools
Belden Machine Co., New Haven, Conn.
Gage Tool Co., Vineland, N. J.
Hammacher, Schlemmer & Co., 4th Ave. & 13th St., New York.
Jennings, C. E. Co., 42 Murray St., New York.
Millers Falls Co., 28 Warren St., New York.
North Bros. Mfg. Co., Philadelphia, Pa.
Ohio Tool Co., Columbus, O.
Progressive Mfg. Co., Torrington, Ct.
Smith, Otis A., Rockfall, Ct.
Stanley Rule & Level Co., New Brittain, Ct.
Starrett, L. S. Co., Athol, Mass.
Swan, James, Co., Seymour, Ct.
White, Van Glahn & Co., 14 Barclay St., New York.
Wilkinson, A. J. & Co., Boston, Mass.

Trimmers.
Dosch Mfg. Co., Bridgeport, Conn.

Trolley Hangers
Richards Mfg. Co., Aurora, Ill.

Trowels
Bishop, Geo. H., & Co., Lawrenceburg, Ind.

Turned, Molded Carved Work
Waddell Mfg. Co., Grand Rapids, Mich.

Varnish
French, Samuel H., & Co., Philadelphia, Pa.

Ventilators
Berger Mfg. Co., Canton, O.
Foster, Wm., & Sons Co., Springfield, Ill.
Globe Ventilator Co., Troy, N. Y.

Veranda Stock
American Column Co., Battle Creek, Mich.

Vises
Hammacher, Schlemmer & Co., 4th Ave. & 13th St., New York.

Wax, Floor Polishing
Johnson, S. C., & Son, Racine, Wis.

Weather Strips
Hammacher, Schlemmer & Co., 4th Ave. & 13th St., New York.

Window Fasteners
Stanley Works, New Britain, Ct.

Window Stop Adjusters
Ives, Hobart B. Co., New Haven, Ct.

Window Trimmings
Caldwell Mfg. Co., Rochester, N. Y.

Windows, Fireproof
Mesker & Bro., St. Louis, Mo.
Mullins, W. H. Co., Salem, O.
Riester & Thesmacher Co., Cleveland, Ohio.

Windows, Storm
Gordon, Van Tine & Co., Davenport, Iowa.

Wood Dyes
Johnson, S. C., & Sons, Racine, Wis

Wood Fillers
Johnson, S. C., & Son, Racine, Wis.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co., Grand Rapids, Mich.

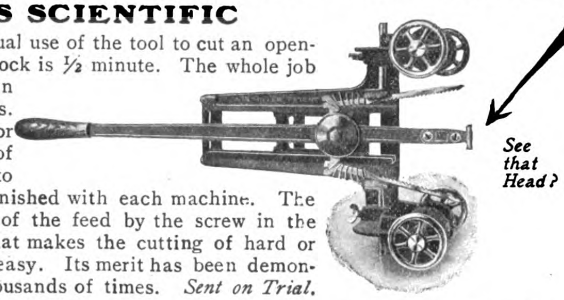
Wood Trimmers
Fox Machine Co., Grand Rapids, Mich.

Wood Working
Lestershire Lumber & Box Co., Lestershire, N. Y.

Wood Working Machinery
American Wood Working Machinery Co., Rochester, N. Y.
Barnes, W. F. & John, Rockford, Ill.
Barnes Tool Co., New Haven, Ct.
Chicago House Wrecking Co., Chicago, Ill.
Cordesman, Meyer & Co., Cincinnati, O.
Crescent Mch. Co., Leetonia, O.
Defiance Mch. Works, Defiance, O.
Fay, J. A. & Egan Co., Cincinnati, O.
Fox Machine Co., Grand Rapids, Mich.
Kidder, R. E., Worcester, Mass.
Marston, J. M. & Co., Boston, Mass
Parks Ball Bearing Machine Co., Cincinnati, O.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
Sidney Tool Co., Sidney, O.

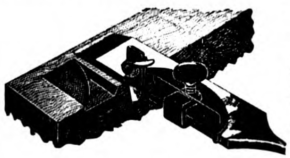
Wood Working Machinery, Second-Hand
Chicago House Wrecking Co., Chicago, Ill.

MILLER'S LOCK MORTISER
IS SCIENTIFIC



The actual use of the tool to cut an opening for a lock is ½ minute. The whole job is done in 3 minutes. Cutters for five sizes of locks ½" to 1⅛" is furnished with each machine. The regulation of the feed by the screw in the head is what makes the cutting of hard or soft wood easy. Its merit has been demonstrated thousands of times. *Sent on Trial.*

See that Head?



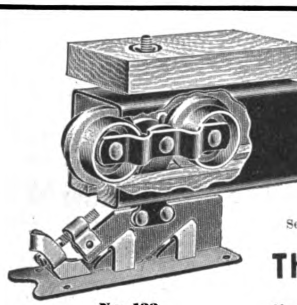
BUTT MORTISER

Cuts the seats for butt hinges in doors, jambs and other work. It does the work in one-third the time and makes a neat, clean, accurate job. Price, including rule gauge, 75 cents.

A. W. MILLER MFG. CO.

Western Office: RIVERSIDE CALIF.

Main Office: CINCINNATI, OHIO



No. 122

WITHOUT A PEER

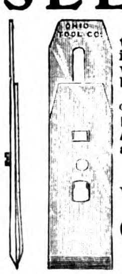
Richards' Royal Ball Bearing House Door Hanger

Perfectly noiseless. Direct center draft. Adjustment in both hanger and track.

Send for catalogue of complete line of Door Hangers and Specialties.

The Richards Mfg. Co.
AURORA, ILLINOIS
New York Office, 101 Reade Street

SEE THAT IRON?



It **absolutely prevents** the **chattering** and **trembling** to which the ordinary thin stamped steel cutter is subject when used on hard or knotty timber. Works equally well in soft wood. This is a point readily seen and appreciated by the experienced mechanic.

Under the trade mark shown above, which is a guarantee of highest quality, we manufacture a full line of

Trade Mark Registered

Planes (both Iron and Wood), Chisels, Drawing Knives, Gouges, Auger Bits, Spoke Shaves, Bench and Hand Screws, Cabinet Makers' and Manual Training Benches, etc.

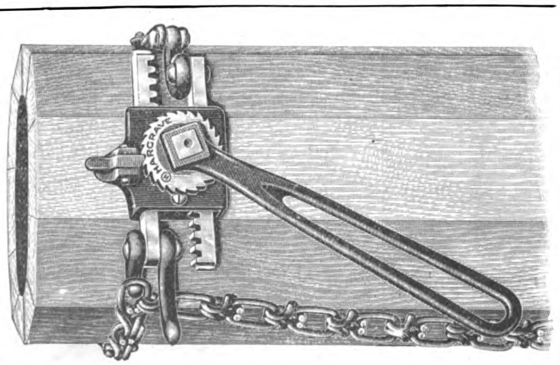
Every Tool Covered by a Broad Guarantee

Write for Catalogue No. C if you are interested in GOOD TOOLS.

OHIO TOOL COMPANY
Columbus, Ohio

HARGRAVE
Column Clamp
PRICE
$2.00
EACH

THE CINCINNATI TOOL CO.
CINCINNATI, O.
Norwood Station



The STEEL SQUARE

Its uses and practical application.

No tool lends itself so easily and quickly in laying out and solving the problems of the carpenter's work.

Books treating the uses and practical possibilities of the Square are a necessity to progressive mechanics.

A STEEL SQUARE LIBRARY

is constituted in the two following sets of books.

A Practical Treatise on the Uses of the Steel Square

By F. T. HODGSON. In two volumes.

Volume I.
242 pages, 177 illustrations. Size, 5½ x 8 inches.
Cloth binding, $1.00.
Half leather, $1.50.

Volume II.
230 pages, 160 illustrations. Size, 5½ x 8 inches.
Cloth binding, $1.00.
Half leather, $1.50.

The Steel Square and its Uses

By W. A. RADFORD, A. W. WOODS and W. REUTHER.

Volume I.
264 pages, 144 illustrations. Size, 6 x 9 inches.
Cloth binding, $1.00.

Volume II.
264 pages, 188 illustrations. Size, 6 x 9 inches.
Cloth binding, $1.00.

These books plainly describe the correct methods of using the Square in laying out all forms of timber construction, showing the practical application of the instrument in all phases of carpentry and joinery, also masonry, cabinet making, &c.

Each work is original in style and treatment, having many interesting examples of work peculiar to itself.

Some Briefer Aids to the Uses of the Square

The Steel Square Pocket Book

By D. L. STODDARD.

A handy pocket guide to the best methods of using the carpenter's steel Square.
109 pages.
112 illustrations.
Cloth binding, 50 cents.

This little book is a good idea, well and concisely carried out.

It is of compact size and slips easily into the pocket, so that the user can keep it about him, always handy for reference.

A feature is the absence of reference letters on the illustrations. To insure the greatest simplicity the cuts show the Square laid on the work so as to give at once the points, lengths and quantities sought.

A. B. C. of the Steel Square

A condensed compilation of the works of F. T. Hodgson. (Edited by himself.)
136 pages.
96 illustrations.
Cloth binding, 50 cents.

An abridged and concise series of selected steel Square problems and solutions.

Any of these works, or single volumes, sent prepaid on receipt of price.

DAVID WILLIAMS CO.
14-16 Park Place, New York.

Do you manufacture or market a product of any kind?

Do you want to reach by circulars or correspondence the concerns and individuals who are possible customers for your output?

On the other hand, do you want to buy, or locate the makers of any given article or material, or the members of any of the architectural, engineering or mechanical trades and professions? If so, use the 1909 edition of

The Commercial Register

A volume of over 1300 pages, with 35,000 business classifications and over 350,000 names and addresses. 88 4-column pages are required to index the contents.

No live business concern can afford to be without this exhaustive trades directory.

As complete and accurate a guide to the business and manufacturing industries as elaborate and painstaking editing could insure—a necessity to the alert business man.

Price Ten Dollars
(DELIVERED)

David Williams Company
14-16 Park Place, New York

10 DAYS FREE

A Floor Scraper That Scrapes

one that actually does the work you want it to—that is the reputation that has been enjoyed by the

WEBER DOUBLE ACTING FLOOR SCRAPER

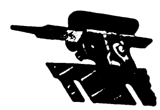
for years. Do you know why?

Because the WEBER is the only Floor Scraper that has adjustable blade holders that can be set at the correct angle to scrape any wood—and a flexible frame which prevents chattering—makes no difference what the wood may be, the WEBER will not leave waves in the floor.

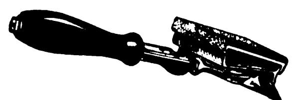
You don't have to take my word for it—try it ten days FREE of all cost to you—let me pay the freight charges—and when you get it give it a hard trial. Then if you're not satisfied—send it back—at my expense—that's liberal, isn't it?

Write for further information. Ask me for my booklet and 1909 Price List of my 10 different models.

The Weber Automatic Sharpening Device



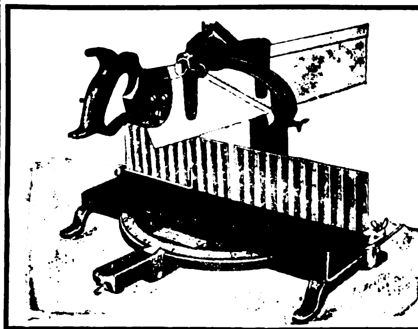
enables the operator to sharpen a blade without removing it from the machine. So simple a child can use it—you can't sharpen at a wrong angle.



The Weber Cabinet Scraper and Sandpaperer.

The handiest device of its kind ever made. Operator has perfect control of it at all times and under all conditions. Price $1.50. For sale by your dealer or direct, postage prepaid.

John F. Weber, Pres. **Weber Manufacturing Co.** 672 71st Ave., West Allis, Wis.



IMPROVED

Union Mitre Box

Best on the Market

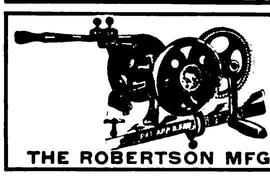
Because

Absolutely open front.
2 Will cut 18" sq., 12" mitre.
3 Saw always out of the way.
4 Cannot cut out of square.
5 Ball bearings.

Six other strong features.

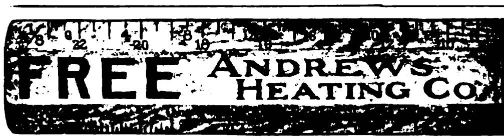
Write for Circular "C."

The Dosch Mfg. Co.
BRIDGEPORT, CONN.



Hero Emery Grinders

A HANDY TOOL FOR THE SHOP or THE HOME
DEALERS WANTED
Write for Prices and Circulars
Made only by
THE ROBERTSON MFG. CO., 1453 Niagara Street, Buffalo, N.Y.



Send us two or more names of persons who are interested in or want to buy Hot Water Heating Plants and we will send this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper and address nearest point to you.

ANDREWS HEATING COMPANY
1062 Heating Building, MINNEAPOLIS 1082 Marine Building, CHICAGO

Dixon's Silica-Graphite Paint

Used on steel work of many of New York's most prominent structures. Also has durability records on exposed surfaces. Write for information concerning **your** class of work.

Joseph Dixon Crucible Company, Jersey City N. J.

Working Samples Of Johnson's Finishes Sent To You Free, Postpaid

Fill out the Coupon and mail to us today and we will send you working samples of Johnson's Plasto-Filler, Johnson's Under-Lac and Johnson's Wood-Dye in any shade you select. (See list of shades on opposite page.)

With the samples we will send you our illustrated guide book containing complete color card and full directions for finishing and refinishing wood. You need this book—and you need the samples. We'll send both immediately upon receipt of the Coupon.

Partial List of Jobbers of Johnson's Wood Finishes

Kohler-McLister & Co., Denver, Col.
Carpenter-Morton Co., Boston, Mass.
The Knight & Wall Co., Tampa, Fla.
Chas. Moser Co., Cincinnati, Ohio.
Walker & Gibson, Albany, N.Y.
Carlson-Lusk Hdw. Co., Boise, Idaho.
Gamble & Ludwig, Minneapolis, Minn.
Pittsburg Plate Glass Co., Atlanta, Ga.
Pittsburg Plate Glass Co., Pittsburg, Pa.
Becker-Moore Paint Co., St. Louis, Mo.
Barber & Ross, Washington, D. C.
Noyes Bros. & Cutler, St. Paul, Minn.
Bridges-Smith & Co., Louisville, Ky.
J. J. Hockenjos & Co., Newark, N. J.
Louis Gallaher Co., Savannah, Ga.
H. M. Hooker Co., 128 W. Washington Street, Chicago, Ill.
Cleveland Window Glass & Door Co., Cleveland, Ohio.
Bennett Glass & Paint Co., Salt Lake City, Utah.
Western Paint, Oil & Glass Co., Lincoln, Neb.
Ilsley & Held, 2264 3rd Ave., New York, N.Y.
Pittsburg Plate Glass Co., New York, N.Y.
Barnes & Nuss, Grand Forks, N. D.
Fred Hummert, San Antonio, Texas.
C. W. Keenan, Brooklyn, N. Y.
Schroeder Paint & Glass Co., Detroit, Mich.
The Bond & Bours Co., Jacksonville, Fla.
Barnard, Porter & Viall, Rochester, N. Y.
Johnson-Woodbridge Co., Indianapolis, Ind.
Marshall-Wells Hdw. Co., Duluth, Minn.
Marshall-Wells Hdw. Co., Winnipeg, Can.
Irvin, Jewell & Vinson Co., Dayton, Ohio.
The Chas. M. Hay Paint Co., Portland, Me.
Campbell Glass & Paint Company, Kansas City, Missouri.
David Bernhardt Paint Company, New Orleans, Louisiana.
Westcott, Slade & Balcom, Providence, Rhode Island.
H. M. Hodges & Brothers, New Haven, Connecticut.
United Sash & Door Company, Wichita, Kansas.
Heystek & Canfield Co., Grand Rapids, Mich.
Fred'k Neeseman & Co., Baltimore, Md.
W. P. Fuller & Co., San Francisco, Los Angeles, Sacramento, Stockton, Oakland, San Diego, Cal.; Portland, Ore.; Spokane, Tacoma, Seattle, Wash.

Why We Make This Offer

We have learned this: The quickest way to convince the Wood Finisher of the superior qualities of the Johnson preparations is to furnish him with samples so he can see for himself that we do not exaggerate the excellence of our products. And so we ask you to send for these samples and make your own tests. You'll never go back to putty or plaster of paris for filling cracks after you have tried Plasto-Filler. After a test of its quality, you will use Under-Lac in place of varnish or shellac.

And just as surely, no ordinary stains will satisfy you once you see for yourself how perfectly Johnson's Wood Dye brings out the natural beauty of the wood.

S. C. JOHNSON & SONS,
Racine, Wis.

Please send samples of Johnson's Plasto-Filler, Under-Lac and Wood-Dye shade No.________. Also booklet. C. B. 12

Name ____________________

Address ____________________

City and State ____________________

My dealer's name is ____________________

NEY'S HINGE HANGER

No. 20

The strongest and best Hinge Barn Door Hanger on the market.

Ask for Prices.

The NEY MFG. CO.
CANTON, O.

"Triple" All=Steel Sash Pulleys

(Seven Styles)

Reduce your labor cost. The automatic fastening device does it.

No. 11—2-inch.

Mills and Contractors can buy them direct. Write **to-day** for a free sample mentioning the pulley you are using.

BRIDGEPORT Sash Pulley Co.,
101 Ottawa St., Grand Rapids
MICHIGAN

DRAWING

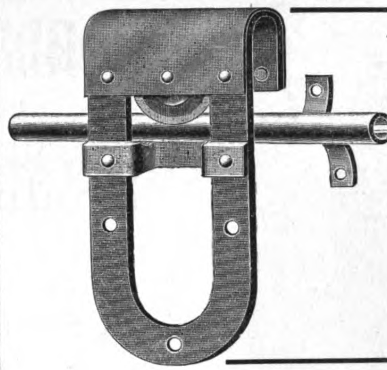
ARCHITECTURAL DRAWING

By C. F. EDMINSTER. A complete and carefully graded course in the elements of architectural drawing. 242 pages. 105 full page plates. Cloth............$2.00

STRUCTURAL DRAWING

By C. F. EDMINSTER. Containing a thorough and well graded course of instruction as applied to the drawing of standard forms, columns, girders, trusses and framing details. 153 pages. 74 full page plates. Cloth....................$2.50

DAVID WILLIAMS COMPANY
14-16 Park Place. NEW YORK



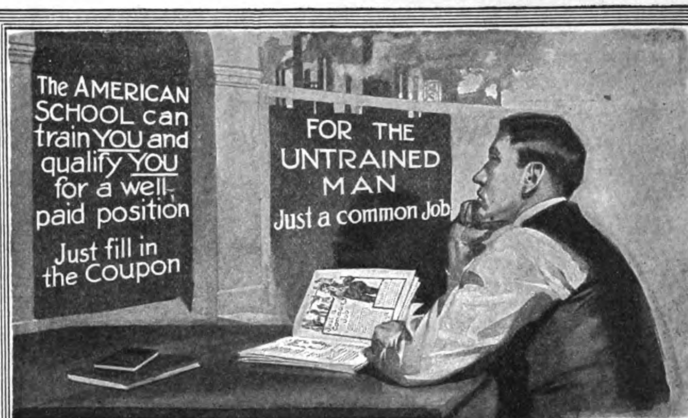
Tubular Track and Hanger

is our latest patent All Steel Rail and Hanger Frame.

¶ The simplest and cheapest Hanger, that can't jump the track, and allows the door to swing outward a considerable distance without cramping either Track or Hanger.

WRITE FOR PRICES

Lane Bros. Co. 423-455 Prospect St. Poughkeepsie, N. Y.



Which Will You Choose?

Will it be "Just a Common Job" at small pay or one of the well paid positions which the American School of Correspondence can train you to fill?

Many poorly paid but ambitious men have overcome greater obstacles than those which confront you—have been trained by the American School to fill a good position at big pay.

It is easy to acquire training. Choose the position you desire to hold by marking and mailing the coupon below. Let us send you a complete solution of your problem.

The American School is the **greatest practical training school** in the world. It will come to you no matter where you live and train you in your own spare time—in your own home.

Make your choice today by filling in and mailing the coupon. There is no obligation. The American School sends complete information quietly and promptly by mail—not by an agent to bother you in your home or at your work. We will tell you frankly and honestly just how we can help you.

Mail the free information coupon today

American School of Correspondence
CHICAGO, U. S. A.

FREE INFORMATION COUPON

American School of Correspondence:
Please send me your Bulletin and advise me how I can qualify for position marked "X"

__Book-keeper	__Draftsman
__Stenographer	__Architect
__Accountant	__Civil Engineer
__Cost Accountant	__Electrical Eng'r
__Systematizer	__Mechan'al Eng'r
__Cert'f'd Public Ac'nt	__Sanitary Eng'r
__Auditor	__Steam Engineer
__Business Manager	__Fire Insur. Eng'r
__Commercial Law	__College Pre'tory

NAME................................

ADDRESS................................

OCCUPATION................................

Carp. & Bldg., 12-09

Height Over All 4 feet 3 inches.

FORBES FURNACE
Note the Comparative Height

FORBES FURNACE

Low Down Type

WITH 1908 ADDITIONS

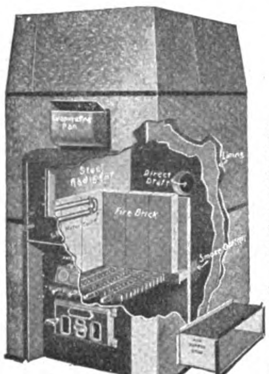
Produces Results

All Cast Iron—Absolutely Gas Tight
Burns Either Hard or Soft Coal.

It Should Lead Your Line

Our Liberal Agency Proposition
Will interest you, write for particulars.

Tubular Heating & Ventilating Co.,
228 Quarry St., Philadelphia.



No. 45
"Leader" Steel Furnace
Price $49 Pipes and Registers Extra
Delivered any station east of Omaha and north of Ohio River

60 Winter Days

Free Trial at Our Risk and Cost

As manufacturers, directly responsible to you for satisfactory results, we will send you a **Hess Steel Furnace** and complete heating outfit, including pipes, registers, fittings and everything needed, made to fit your measurements, with correct plans and instructions for installing, at **25 to $100 less** than you can buy from dealers. We deliver the outfit at your station, freight prepaid. You place the purchase price in the hands of your local banker, who will hold the money 60 days, while you test the heater.

In case the test is not satisfactory in every way, you may return the goods at our expense and the banker will refund your money.

This valuable booklet mailed free

Don't Pay an Exorbitant Price for a Heating Outfit

We have manufactured heating outfits for 35 years, and can assure you that there is no necessity for paying the exorbitant prices demanded by others in order to have a modern, high-grade furnace and outfit installed in your building.

Installing a Hess Furnace is Easy-We Furnish Plans and Tools Free

By following our simple, clear plans and directions, any man handy with tools can easily install a Hess Furnace and outfit. We furnish all the neceesary tools.

Send us a rough sketch of any building you wish to heat. Without any charge or obligation on your part, we will have our expert furnace draftsmen prepare a plan which you can easily understand, showing the best way to heat your building, including every detail of the furnace, pipes, registers, etc., in their proper places, with the exact cost to you of the complete equipment. No charge for this.

Write for our free booklets, **"Modern Furnace Heating"** and **"These Bear Witness."** They tell much you should know before ordering your heating equipment.

Many people delay ordering their heating equipment until to late too have it installed before cold weather sets in. It is always advisable to avoid the usual fall rush and thus have your furnace ready to operate when the cold weather arrives.

This booklet mailed free

Write Today for Free Booklets and Estimate.

Hess Warming and Ventilating Co., 909 Tacoma Bldg. Chicago

GRINDSTONES

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.
6th Floor, Hickox Bldg., **CLEVELAND, O.**

A Good Combination Set of Bits

No. X 11, with expansive bit cutting 8-16 to 24-16. Swan trad mark. Fully warranted in every way.

THE JAMES SWAN CO.
Seymour, Conn.

RUSSELL & ERWIN MFG. CO., Sales Agents
New York, Philadelphia, San Francisco
New Britain, Chicago, London, England

Best Books on CARPENTRY

Competition among publishers results in an especially good value in books on carpentry. The works listed below are attractive, well illustrated volumes, treating the principles and practice of the craft plainly and by competent writers. They are

PRACTICAL WORKING GUIDES

for students of construction, or serve as references for mechanics, to any given phases of the carpenter's work.

RADFORD'S PRACTICAL CARPENTRY

In two volumes, each size 6 x 9 inches.

Vol. I. 264 pages, 144 illustrations..$1.00
Vol. II. 264 pages, 188 illustrations.$1.00

Large Clear Print, Substantial Cloth Binding.

HODGSON'S MODERN CARPENTRY AND JOINERY

In two volumes, each size 5½ x 7¾ in.

Vol. I. 300 pages, 318 illustrations..$1.00 (Advanced work.)
Vol. II. 400 pages, 300 illustrations.$1.50

The works of Radford and Hodgson are representative of reliable modern practice and may be recommended without reserve to students of carpentry and building construction.

HICKS BUILDERS' GUIDE

(Nineteenth thousand.)

166 pages, size 5 x 6¾ in., 114 illustrations, cloth bound..........$1.00

This has always been popular and satisfactory as a guide for the contracting carpenter. Very full on the different forms of roof framing, and gives a complete and simple system of estimating labor and material for suburban construction.

MELOY'S PROGRESSIVE CARPENTRY

89 pages, size, 5½ x 7½, including 42 full page plates, cloth binding...$1.00

A very serviceable book for carpenters, treating practical roof framing and truss construction with numerous diagrams. There are drawings of trusses of different spans and dimensions, all found by the test of use to be of reliable and approved construction.

KIDDER'S BUILDING CONSTRUCTION and SUPERINTENDENCE

Part II. Carpenters' Work, 544 pages, size 7 x 9¾ in., 525 illustrations, cloth bound $4.00

In respect to breadth of scope, this is the most complete of all works on the subject. More than a mere carpenter's guide, it deals with descriptions of the methods of doing all classes of work that would be included in the carpenter's specifications, including interior and exterior trim and equipment, light and heavy framing, &c.

SYLVESTER'S MODERN CARPENTRY AND BUILDING

Second Edition, enlarged, 276 pages, size 5½ x 8 in., 100 plates, cloth bound $1.50

This work explains the details of laying out the carpenter's work. A leading feature is its series of exercises in house planning for the instruction of ambitious young carpenters and builders. Contains a great collection of perspective views, floor and framing plans.

Any of these works, or single volumes, sent prepaid on receipt of prices.

DAVID WILLIAMS CO.

14-16 Park Place NEW YORK

BOOKS Reference books are indispensable aids to speed and accuracy on the part of the workman. We furnish advice about the best books on all subjects related to the building trades.

DAVID WILLIAMS COMPANY

14-16 Park Place NEW YORK

Surrounded with Knowledge

With this complete ten volume set of

Architecture, Carpentry and Building

you can practically surround yourself with the knowledge you need in your every-day work. You can have at your fingers' ends, for instant use, the help and advice of forty experts.

The Reference Value of This Cyclopedia is Guaranteed

by the fact that they are compiled from text books used in the correspondence courses of the American School.

Read What This Great Work Comprises **It is the most exhaustive, comprehensive and authoritative work on the building trades ever published. Covers every branch of building construction, from plans to finishing touches. Bound in half morocco; 4,670 pages, 7x10 inches, printed on special paper; large, clear type.**

CONTAINS: Plans, color plates and photos of buildings completed and in course of construction. Diagrams and sections showing all details. Over 400 full page plates, 3,000 detail drawings, diagrams, etc. Just the thing for the student and a practical guide for the experienced carpenter, and an ever ready reference work for the expert.

Our Liberal Offer: To introduce our Correspondence Courses, from which the Cyclopedia is compiled, we offer this set of books at the special price of $24.00, payable $2.00 after 5 days and $2.00 a month Regular price is $50.00. Order now and save over 50 per cent.

PARTIAL LIST OF CONTENTS

Carpentry—Building Superintendence—Estimating—The Law of Contracts and Liens—Masonry—Stair Building—Reinforced Concrete—Contracts and Specifications—Building Materials—Heating—Ventilation—Hardware—Steel Construction—Elevators—Architectural Drawing—Freehand Drawing—Blue Printing—Greek and Roman Orders—Water Color Hints for Draftsmen—Painting—Wiring of Door Bells—Sheet Metal Pattern Drafting—Mechanical Drawing—Lettering—Shades and Shadows—Rendering in Pen, Ink and Wash, etc.

For a short time we will include, as a monthly supplement, absolutely free of charge for one year, the TECHNICAL WORLD MAGAZINE. This is a regular $1.50 monthly, full of Twentieth Century Scientific facts, written in popular form. Also contains the latest discussions on timely topics in invention, discovery, industry, etc.

AMERICAN SCHOOL OF CORRESPONDENCE

Chicago, U. S. A.

FREE OFFER COUPON

Carp. & Bldg 12-'09

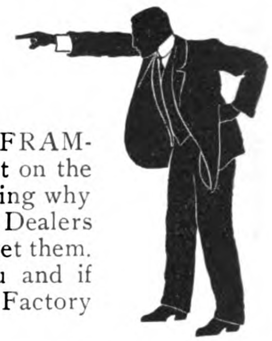
A. S. of C.

Please send set Cyclopedia of Architecture, Carpentry and Building for 5 days' free examination, also T.W. for one year. I will send $2 within 5 days and $2 a month until I have paid $24.00; or notify you and hold the books subject to your order. Title not to pass until fully paid.

Name..............................
Address..............................
Employer..............................

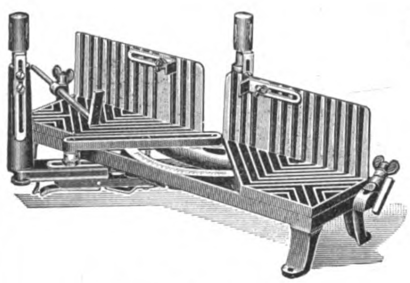
—IT'S UP TO YOU—

Mr. Carpenter



To see that the dealer furnishes you with the NICHOLLS FRAMING SQUARE which is the first Framing square ever put on the market. All others are imitations. If it were not a good thing why should they imitate it. We have learned of late that some Dealers say there is no such Square made, others say they cannot get them. WELL, WE WISH TO SAY they can get them for you and if they will not we will furnish them to you direct from the Factory and prepay the freight.

NICHOLLS MFG. CO. - - OTTUMWA, IOWA



REASONS WHY IT IS THE BEST

1. **Plates cast solid with frame, for strength and rigidity.**
2. **Bed and back ribbed allowing clearance for sawdust.**
3. **Graduated.**
4. **Lever locks at any angle.**
5. **Crown moulding clamps.**
6. **Duplicate length gauges.**
7. **Automatic stops for holding saw.**
8. **Nickel plated.**

CIRCULAR UPON REQUEST

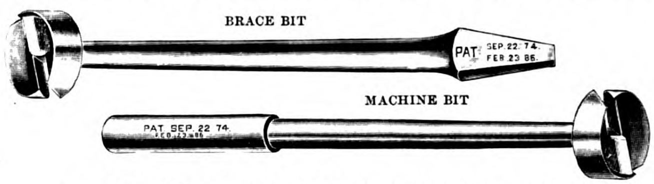
Have your dealer show you a
NICKEL PLATED

MARSH-AYER MITER BOX

H. C. MARSH CO.

305 Race Street, : : : ROCKFORD, ILL.

THE "FORSTNER" LABOR SAVING AUGER BIT



Unequaled for delicate work, is guided by its rim instead of its centre — will bore any arc of a circle — and guide in any direction. Works smoothly in hard wood or where the grain is awkward. Does more and better work than other bits. Special prices in complete sets.

THE PROGRESSIVE MFG. CO. TORRINGTON CONN.

Carpenters save your time and temper—use our

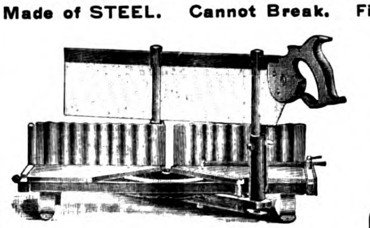
CONCAVE TOOL GRINDER

The tool used by thousands of the best carpenters all over the world.
Solid special emery wheel 6 x ¾". *Guaranteed.*

The Frontier Iron Works
Successors to
The Robertson Drill & Tool Co.
Cor. Letchworth and Grant Streets
BUFFALO, N. Y.
San Francisco Agent, Geo. H. Edwards

GOODELL MITRE BOX

Made of STEEL. Cannot Break. First in Quality and Improvements.



Automatic stops for holding up saw.
Corrugated backs. Graduated.
Gauge for duplicated cuts and many other features.
If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. CO. GREENFIELD, MASS.

means much. We asked him for "pointers." This is what he says:—" Do you know a good thing when you see it? Well, it's a Simonds Saw. I have used them a long time. **Pointers?** Well, then—look for their trademark. When you see THAT you're safe in buying. There's a big concern back of it.

Another thing:—Simonds Saws are good cutters. They cut clean and smooth, and hold their edge a long time.

They use a special kind of crucible steel, made in their own mills, and used only in their own saws. Guess they are proud of it for they always advertise

Made of Simonds Steel

They have a special patented way of tempering them so that all the saws are reliable. You don't buy any that are too hard or too soft, for Simonds Saws are just right.

There's the stiffest kind of a guarantee against any flaws in the saws, and **they back it up.**

Oh, I could tell you lots about that saw, but I must get to work. There's this thing about it—You won't forget the Simonds qualities when once you have used the saw."

Simonds Saws Are the Best and They ARE the Best!

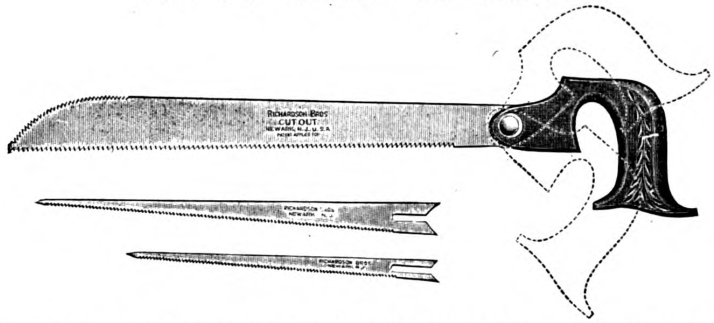
At the Alaska-Yukon-Pacific Exposition, Seattle, Wash., Simonds Saws were given THE GRAND PRIZE award by a Jury of especially practical men. No other make of Hand Saws in the world received an award of equal merit.

Get a Simonds Saw of your dealer. If he don't keep them, send to headquarters and they'll see that you get one. If you want something interesting, ask for "Simonds Guide for Carpenters."

SIMONDS MFG. CO., - - Fitchburg, Mass.

Chicago New York New Orleans San Francisco Portland Seattle

No. 190 NEST OF SAWS



This Nest consists of Carved and Polished Apple Handle, adjustable to various positions, together with patent tightener of special device, also three blades which are adjustable, interchangeable and reversible. The largest one or "cut-out" blade has been especially designed to fill the need of a tool by which the mechanic can cut out any particular section of floor, partition or ceiling without the necessity of boring holes, chiseling, etc. Sections cut out with this blade can be replaced in original position if desired.

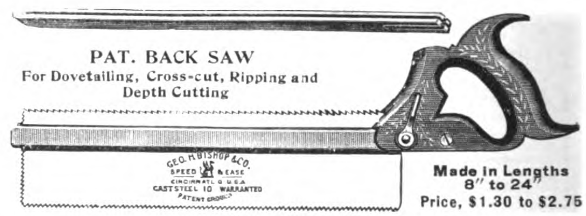
THE NATIONAL SAW COMPANY, NEWARK, N. J.

THE AKRON ECLIPSE LEVELS

Manufactured by The BAKER McMILLEN CO., AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

BISHOP



Patent Adjustable Interchangeable Blade and Receptable Back Mitre and Housing Saw. The back of this saw constitutes a slot, through which the blade slides, enabling the workman to move, space and adjust it any desired width or distance from edge of back, permitting him to cut with precision and exactness any desired depth, thus saving all the additional labor and time otherwise necessary to measure and mark each separate piece of material. The blade can be easily and quickly slid in position and suitably adjusted by reversing the thumb lever that fastens the back into the handle and firmly holds the blade in proper place.

The blades are made of spring steel, hand filed and set ready for use. Extra blades of any points or style of tooth furnished. One side for Cross and other side for Rip sawing.

The saw is one of intrinsic merit, recommended by every intelligent mechanic and skilled laborer. Simple and quick to adjust, easy and varied to use.

Manufactured by GEO. H. BISHOP & CO., CINCINNATI, - OHIO; LAWRENCEBURG, IND.

SAWS

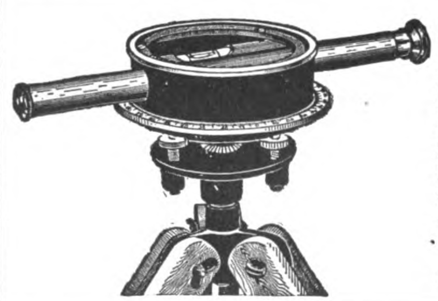
Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts

A. J. WILKINSON & CO.
180-188 Washington St., Boston, Mass., U.S.A.

BOSTROM'S
IMPROVED BUILDERS' LEVEL



An absolutely reliable leveling instrument for Architects, Builders, Contractors, Stone Masons, Cement and Sidewalk Workers. Used for any kind of foundation work, grading, road building, getting angles and for all general work requiring a Level. Made of Brass, oxidized and has silvered circle of degrees. Has Achromatic Telescope with magnifying power of 15 diameters.

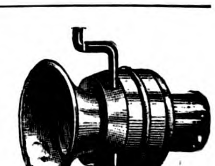
Complete outfit including Level, Telescope and Plumb-bob in neat wood box, also Tripod and hard wood Rod and Target, shipped ANYWHERE C.O.D., $25.00, and express charges, SUBJECT TO EXAMINATION. ORDER NOW or write for Circulars.

BOSTROM-BRADY MFG. CO.,
53 W. Alabama St., Atlanta, Ga., U.S.A.
1153 Pine St, St. Louis, Mo.

W. R. OSTRANDER & CO., 22 Dey Street, New York City.

Manufacturers of Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.

Send for Catalogue



Factory 1431-1439 De Kalb Avenue, Brooklyn.

THE WILLIAMS PRINTING COMPANY, NEW YORK